	Енергия A T1	1.8.1 (0000000,000*kWh)
	Енергия A T2	1.8.2 (0000000,000*kWh)
	Енергия – A (общо), формула за изчисление: –A = |-A|	2.8.0(0000000,000*kWh)
	Експлоатационен регистър "Тотал +A"	C.8.0(HHHHHHMM)
	Експлоатационни тарифни регистри: 1. Тарифа = T1 2. Тарифа = T2	C.8.1(HHHHHHMM) C.8.2(HHHHHHMM)
	Експлоатационен регистър " Тотал -A"	C.82.0(HHHHHHMM)
	Брой спадове на напрежението	C.7.1(00000000)
	SW идентификация	0.2.1 (ver. 03,170927,69B0)
	Дата и час на последна параметризация, формат ZST10	C.2.1(YYMMDDHHMM)
	Дата и час на последно отчитане, формат ZST10	C.2.9(YYMMDDHHMM)
	Дата и час на последно отваряне на калака и статус, формат ZST10	C.2.4(F,YYMMDDHHMM)
	Текуща дата	0.9.2(YYMMDD)
	Текущо време	0.9.1(HHMMSS)
	Експлоатационен регистър на батерията	C.6.0(YYMMDDHHMM)
	Напрежение на батерията	C.6.3(x.xxV)
33.	Живот на устройството	> 15 години
34.	MTBF	1 250 000 часа
35.	Клас на защита	II
36.	Механичен клас	M1
37.	Електромагнитен клас	E2
38.	Размери (H x W x D)	202mm : 108mm : 57mm
39.	Тегло	Приблизително 0,500kg

Поддръжка: Електромерите „Daisy IVEL 3CFC" нямат нужда от допълнителна поддръжка. Не се извършва ремонт в случай на механични повреди (по време на транспорт или съхранение).

При отваряне на електромерите „Daisy IVEL 3CFC", производствената им гаранция става невалидна!

Приложение 1.11

ЕДНОФАЗЕН, СТАТИЧЕН ЕЛЕКТРОМЕР ЗА АКТИВНА ЕНЕРГИЯ

МОДЕЛ "Daisy IVEL 3CFC"

1. ОБЩА ИНФОРМАЦИЯ

"Daisy IVEL 3CFC" е еднофазен статичен kWh електромер, който измерва активна енергия в еднофазна дву-проводна мрежа за домашни и малки промишлни консуматори. Той е проектиран за директно свързване. Електромерът отговаря на EN50470-1 и EN50470-3 и е произведен в съответствие със стандарт ISO9001:2008. Електромерът позволява запис на енергия в един или два тарифни регистри, предварително зададени по време на производство. Начина на управление на тарифите зависиси от избрания режим на тарифиране, който се задава чрез параметризиране през оптичен комуникационен интерфейс. Точността на измерваната електрическа енергия съответства на клас индекс A, като стойностите на измерената електрическа енергия се изобразяват в kWh на 7 разреден течно-кристален дисплей с подсветка. Данните за натрупаната енергия по тарифи и фази, а също така информация за важни събития, възникнали по време на работа на електромера, се записват в енергонезависима памет, от където по-късно могат да се прочетат през оптичен интерфейс.

2. СЪВЕТИ ЗА БЕЗОПАСНОСТ И ИНСТАЛАЦИЯ

- *Инсталацията на електромера е позволено да се извършва само от упълномощен персонал.*
- *По време на инсталацията или подмяна на електромер, проводниците към които е свързан трябва да бъдат изключени. При монтажа или подмяната на електромера, проводникът, към който е свързан електромерът, трябва да се изключи. Докосването на части, които се захранват, е изключително опасно. Предпазителят трябва да бъде изваден и съхраняван на безопасно място - за да се избегне използването му от неоторизирани лица.*
- *Измервателните уреди трябва да се използват изключително за измерване на електрическа енергия и трябва да се използват само в рамките на спесифицираните технически данни.*

3. ИНСТАЛАЦИЯ

Електромерите Daisy IVEL 3CFC са подходящи за инсталация в разпределителни табла или малки кутии, за монтаж на стена или панелен монтаж.

Инструменти:

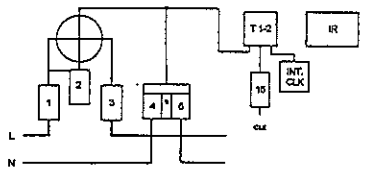
- Кръстата отвертка No.1
- Кръстата отвертка No.2
- Инструмент за отстраняване на изолации

Приложение 1.11

Свързване:

Електрическата връзка се осъществява чрез винтови клеми. Означенията на клемите са релефно маркирани в клемореда на електромера (вижте фиг.1 за диаграмата на свързване). Свързващите винтове трябва да бъдат затегнати, като се използва следният въртящ момент:

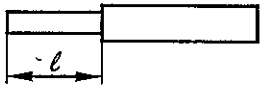
- Основни клеми (винт M5) 2.0 N.m
- Спомагателни клеми (винт M3) 1.0 N.m



Фиг.1 Схема на свързване

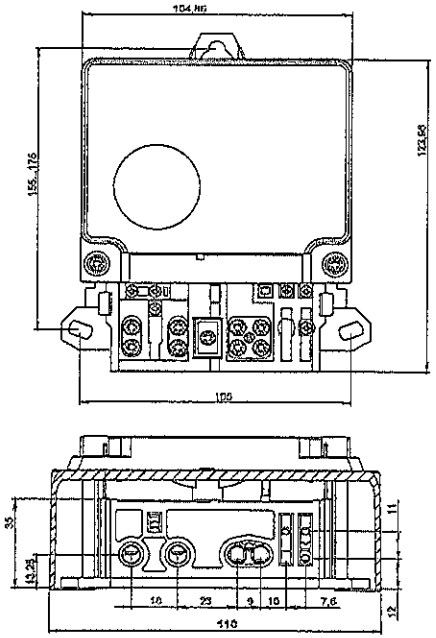
Монтиране и свързване:

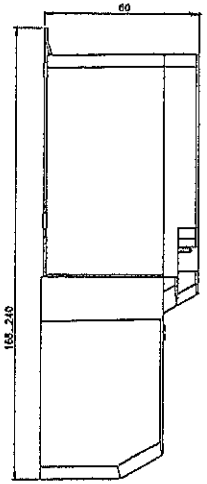
- Изключете захранването.
- Монтирайте електромера Daisy IVEL 3CFC към DIN43857 мрежата, вижте фиг.1.
- Оголете изолацията на кабела до пропоръчителната дължина, вижте фиг.2.
- Свържете кабелите съгласно схемата за свързване на Daisy IVEL 3CFC. Използвайте посочените по-горе стойности на въртящия момент.



фиг.2

Клема тип	L(дължина за оголване) , mm
Основна клема	20
Спомагателна клема	10





фиг.3 Размери на електромера

23.	Консумирана мощност: ▪ Токова верига ▪ Напрежителна верига - Активна мощност - Пълна мощност	 ≤ 30mW @ 5A ≤ 1,6 W @ 60A ≤ 0,45 W @ 230V ≤ 4 VA @ 230V
24.	Тестов изход	LED (видим спектър)
25.	Токови клеми за свързване	Позволяват надеждно свързване на проводници 2.5-35 mm². Фиксирането на проводника в клемата се осъществява чрез два винта.
26.	Спомагателни клеми	Позволяват надеждно свързване на индивидуални проводници от 0.5 до 6 mm² напречно сечение
27.	Логика на тарифния контрол	Вътрешно от RTC или външно T1 = клема # 15 е свързана към L T2 = клема # 15 е не свързана Превключването на тарифите може да бъде активирано от напрежението подавано на коя да е фаза.
28.	Комуникационен порт	IEC 62056-21 оптичен порт, отчитане Четене/Запис
29.	Електрически импулсен изход	Клеми 20 (+) и 21 (-)
30.	Батерия	Вътрешна литиева батерия за поддържане на RTC Изобразяване на показанията без захранване
31.	Точност на часовника	≤ 0,5 S при (23° C) ≤ 0,15 S на ден/на °C
32.	Метод на изчисляване на енергията	$A_{T1/T2} = \|+A\| + \|-A\|$ $A_P = \|-A\|$
	Ред и формат на показаните стойности	OBIS кодове на регистри (формат на дисплей)
	Фабричен номер	C.1.0 (1534567890)
	Баркод	0.0.0 (9011101534567890)
	Константа на електромера за активна енергия – оптичен изход	0.3.0 (10000imp/kWh)
	Код за събитие или грешка	F.F (0000)
	Енергия A (общо)	1.8.0 (0000000,000*kWh)

15. Технически данни

No	Параметър	Стойност
1.	Тип електромер	Еднофазен електромер за активна енергия
2.	Нормативни документи	EN50470 – 1 & EN50470 – 3 (MID)
3.	Тип на свързване	Еднофазно 2-проводно
4.	Обхват на измерване	Активна енергия (консумирана и произведена)
5.	Номинално напрежение, Un	230 VAC
6.	Работен обхват на напрежението	−20% ÷ +15%Un
7.	Permanent withstand voltage	500VAC
8.	Номинална честота	50Hz
9.	Индекс на клас на точност	A
10.	Номинален ток (I_{ref})	5 A
11.	Максимален ток (I_{max})	60 A
12.	Преходен ток (I_{tr})	0.5A
13.	Стартов ток (I_{st})	≤ 15 mA
14.	Константа на електромера	10000 imp/kWh
15.	Спесифициран работен температурен обхват	−25 °C до 55 °C (клас 3K6)
16.	Граничен работен температурен обхват	−40 °C to 70 °C (клас 3K7)
17.	Граничен температурен обхват за транспорт	−40 °C to 70 °C (клас 2K4)
18.	Граничен температурен обхват за съхранение	−40 °C to 70 °C (клас 1K5)
19.	Относителна влажност	≤ 75% (годишно средна) ≤ 95% (средно на 30 дни/година)
20.	Защита срещу проникване на прах и вода	IP51(IEC 60529)
21.	Разделителна способност на показваната енергията на дисплея	1 kWh / 0.001 kWh в тестов режим
22.	Регистри	LCD дисплей - до 2 тарифи, 7 числа

Приложение 1.11

Проверка:

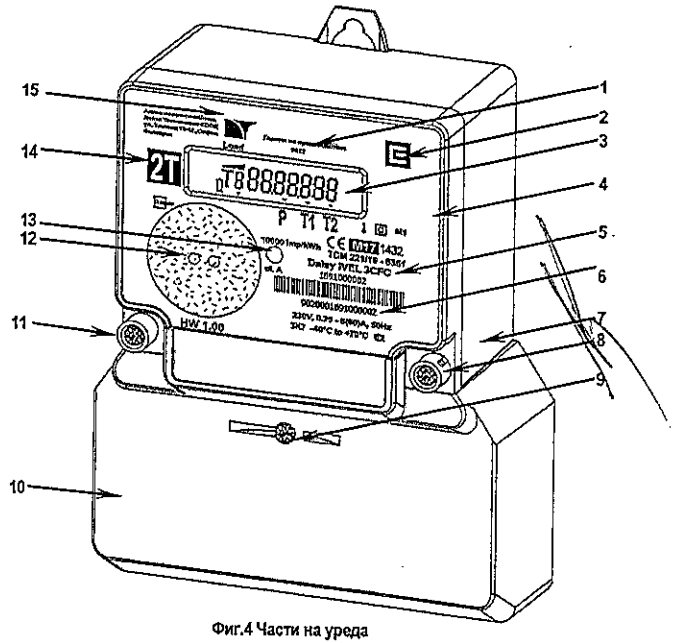
- Свържете електромерът Daisy IVEL 3CFC към напрежението, както е посочено в раздел Технически данни.
- Включете захранване с товар, свързан към електромерът (най-малко 10 W активно захранване). Проверката за автоматична инсталация започва.
- При стартиране всички сегменти трябва да се включат за кратко на дисплея. Изчакайте, докато на дисплея се покаже сорийният номер или "Грешка". Ако е "Грешка", проверете кодовете и разрешенията за грешки в секцията Отстраняване на неизправности.
- Ако уредът е монтиран правилно, светодиодът трябва да мига за две минути и поне първият сегмент от индикатора за натоварване трябва да светне.
- В случай на обратно свързване, ще се появи символ със стрелка, сочещ към "P". Ако това се случи, моля проверете връзките съгласно схемата за свързване.

4. ЧАСТИ НА ЕЛЕКТРОМЕРА

Таблицата по-долу и фиг.4 показват частите на електромера Daisy IVEL 3CFC

Позиция №	Част	Позиция №	Част
1	Маркировка на собственика	9	Пломбажен винт M4x14, снабден с пломба на инсталатора
2	Година на производство	10	Уплътнителен капак на клемите
3	LCD дисплей	11	Пломбажен винт M4x14 снабден с пломба на производителя
4	Пломбируем капак на електромера	12	Оптичен интерфойс
5	Маркировка на типа на електромера	13	Оптичен тестови изход
6	Фабричен номер	14	Обозначение на категориите тарифи
7	Основа	15	Лого на производителя
8	Пломбажен винт M4x14, снабден с пломба за метрологична проверка		

Таблица 1. Части на уреда



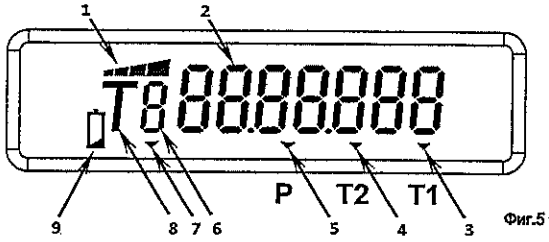
Фиг.4 Части на уреда

5. ВИДОВЕ ЕЛЕКТРОМЕРИ

Електромерите Daisy IVEL 3CFC се произвеждат в две функционални разновидности:

- Еднотарифни електромери
- Двутарифни електромери

6. ОПИСАНИЕ НА ДИСПЛЕЯ



Фиг.5 Описание на дисплея

Позиция No	Описание
1	Товаров индикатор
2	Стойности
3	Индикатор за активна мощност тарифа T1
4	Индикатор за активна мощност тарифа T2
5	Индикатор за върната енергия
6	Символ на показвания енергиен регистър, дата и / или час
7	Разрешение за параметризация
8	Тарифен символ
9	Индикатор за разредена батерия

Таблица.2 Информация за дисплея

7. КОНТРОЛ НА ТАРИФИТЕ

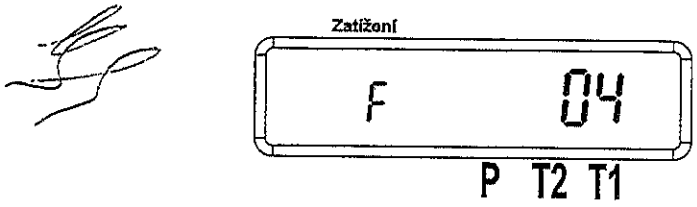
Режимът за управление на тарифите е фабрично програмиран в режим на вътрешно управление. Този режим може да бъде препрограмиран през оптичния комуникационен порт със съответен софтуер за параметризиране и оптична комуникационна сонда. За да се промени режимът на работа или промяна на тарифните таблици е необходимо устройството да влезе в режим на параметризация и да се подаде парола, съответстваща на 1^во ниво на достъп. Вътрешния режим на тарифиране се управлява от часовник за реално време-календар и зададени тарифни таблици, които определят TOU (зоните на времената за употреба). За повече информация за създаването и използването на тарифните таблици, вижте ръководството за софтуер "Meter ConfiguratorSE". Когато електромера е програмиран в режим на външно управление, двете тарифи в този режим се управляват от външен тарифен вход. Свързването на външния тарифен вход (клема 15) към коя да е фаза от електрическата мрежа, ще зададе на електромера тарифа 1. Когато външния тарифен вход се остави несвързан, ще зададе на електромера тарифа 2.

Приложение 1.11

14. СЪВЕТИ ЗА ДИАГНОСТИЦИРАНЕ НА ГРЕШКИ

В тази част са описани кодовете за грешка, изобразявани на дисплея.

Код за грешка	Значение	Препоръчително коригиращо действие
02	Отворен капак на електромера	При възникване на такава грешка, тя може да бъде изчистена от оператор със специални права за достъп и със съответното оборудване
04	Невалидна структура на енергийните регистри.	Свържете се с доставчика на уреда
08	Невалидни конфигурационни регистри на микроконтролера	Свържете се с доставчика на уреда
16	Невалидна структура за експлоатационнте времена	Свържете се с доставчика на уреда
32	Невалидна структура „device parameters".	При възникване на такава грешка, тя може да бъде изчистена от оператор със специални права за достъп и със съответното оборудване
64	Невалидна структура на тарифните таблици	При възникване на такава грешка, тя може да бъде изчистена от оператор със специални права за достъп и със съответното оборудване
128	Невалиден дневник на събития	Свържете се с доставчика на уреда



Забележка: EEPROM (Electrically erasable programmable read-only memory) е вид чип за компютърна памет, който запазва неговите данни, когато се изключи захранването му.

13.2. Събития по време - автоматични месечни самоотчети.
Електромерът създава този тип запис на всяка 1ва дата от месеца в 0.00 часа. Ако електромерът не е захранен в този момент, записът ще бъде създаден при следващото включване.

13.2.1. Отчети за енергийните регистри. Има 3 вида енергийни регистри, за които електромерът създава месечни самоотчети.

- Исторически месечни записи на енергиен регистър за тарифа 1;
  Връща OBIS код: 1.8.1-xx(0000000,000*kWh)
- Исторически месечни записи на енергиен регистър за тарифа 2;
  Връща OBIS код: 1.8.2-xx(0000000,000*kWh)
- Исторически месечни записи на енергиен регистър за върната енергия.
  Връща OBIS код: 2.8.0-xx(0000000,000*kWh)

13.2.2. Месечни отчети на регистрирани максимални активни средни мощности за 15 минутен период от време.

- Максимална активна средна мощност по тарифа 1
  Връща OBIS код: 1.6.1-XX(0000,00*kW, YYMMDDHHMM)
- Максимална активна средна мощност по тарифа 2
  Връща OBIS код: 1.6.2-XX(0000,00*kW, YYMMDDHHMM)
- Максимална експортирана активна средна мощност
  Връща OBIS код: 2.6.0-XX(0000,00*kW, YYMMDDHHMM)

13.2.3. Месечен отчет на брояча на спадането на напрежението на мрежата.

- Брой спадания в напрежението на мрежата
  Връща OBIS код: C.7.0-xx(00000000)

Приложение 1.11

8. ИНДИКАТОР ЗА НАТОВАРВАНЕ

Фиг.6 Визуализация на индикатора за натоварване

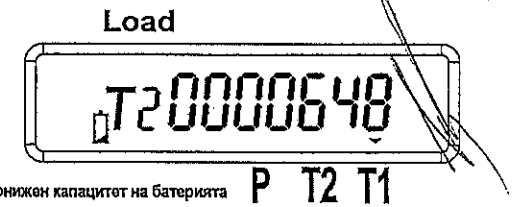
Когато електромерът акумулира активна енергия (I > I старт), товарният индикатор е показан на LCD. Първият (най-малък) символ ще светне, когато измерената активна енергия е по-голяма от изходния енергиен праг. Следващите три символа светват последователно един по един, в зависимост от активната средна мощност за 1 sec (вижте състоянието на товарния индикатор в Таблица 3). Всички сегменти светят, когато средната енергия е по-голяма от 3000 W.

Състояние на товарния индикатор	Активна мощност, W
	< 3.5
	≥ 3.5
	≥ 150
	≥ 400
	≥ 3000

Таблица 3. Мощностни прагове на индикатора за натоварване

9. ИНДИКАЦИЯ ЗА РАЗРЕДЕНА БАТЕРИЯ

За коректната работа на часовника за реално време (RTC) е използван вътрешен резервиран захранващ източник от батерия (1100 mAh LiSOCl2), в случай на изключване на захранващото напрежение. За индикация на състояние понижен капацитет на батерията, на дисплея перманентно се засветва символът батерия. Прагът за детектиране на капацитета на батерията фабрично е настроен на 10% от номиналният и капацитет. Когато батерията е напълно разредена, този символ ще мига. От този момент нататък, всички времеви щампи на събитията ще бъдат некоректни.



Фиг.7 Индикация за понижен капацитет на батерията

Допълнителна информация за батерията може да се получи през оптичния комуникационен порт

- Експлоатационно време на батерията
  OBIS code: C.6.0(YYMMDDHHMM)
- Напрежение на батерията
  OBIS code: C.6.3(x.xxV)

10. ОТЧИТАНЕ, НАСТРОЙКА НА ПАРАМЕТРИТЕ НА ЕЛЕКТРОМЕРА, УПРАВЛЕНИЕ НА СЪБИТИЯ И РЕЖИМИ НА РАБОТА

Електромерът има вграден оптичен интерфейс, който е предназначен за отчитане, настройка на параметрите на електромера, управление на събития и промяна на режимите на работа. Интерфейсът е съвместим със стандарт EN62056-21, протокол С (поддържани скорости на предаване до 38400 bps.) и стандарт EN62056-61 за OBIS кодове. Може да бъде установена връзка между електромера и PC, посредством IR оптична комуникационна сонда "LINK-21" и подходящ софтуер. Windows базирано приложение "Meter Configurator" може да осигури достъп до измервани стойности и параметри. За повече информация относно параметрите на електромера, моля прочетете "Meter ConfiguratorUG.pdf".

11. ТЕСТОВ РЕЖИМ

Електромерът има функция да се превключва в тестов режим. Влизането в този режим се извършва чрез подаване на команда през оптичния интерфейс. Когато електромерът приеме командата, разделителната способност на енергийният регистър, изобразяван на дисплея се увеличава до 1 Wh. Този режим се използва за бързо тестване, като се използва методът време-мощност. Излизането от този режим се осъществява при изключване на захранващото напрежение. За повече информация моля прочетете документа "Meter ConfiguratorUG.pdf"!

12. ВЪТРЕШЕН RTC – КАЛЕНДАР

Вътрешния RTC се използва за определяне на времеопределящите процеси (wear leveling) и запис на времевите щампи на всички събития. Вътрешния календар поддържа автоматична смяна на зимно/лятно часово време (daylight saving - DST), съгласно CET/CEST.

12.1. Четене на текущата дата и час

Четенето на датата и часа на вътрешния RTC е достъпно само чрез оптичен комуникационен интерфейс. Датата и часът са достъпни чрез изчитане на показанията с техните съответни OBIS кодове: 0.9.2 (дата) и 0.9.1 (час).

12.2. Настройване на дата и час

Установяването или настройването на датата и часа на вътрешния RTC е достъпно само чрез оптичния комуникационен интерфейс. За повече информация, моля използвайте "Meter ConfiguratorUG.pdf"

13. ЗАПИСВАНЕ НА СЪБИТИЯ И ОТЧИТАНЕ

Електромерът има функционалност да регистрира външни събития – електрически и не-електрически. Той също така създава автоматични отчети за някои от измерените електрически величини, базирани на времевия метод. Първият тип събития е външно задействан, докато вторият тип събития е отчет, създаден на определен период от време - всеки календарен месец. За него електромерът създава текущи и исторически записи, които съхранява във вътрешна NV памет. Тези записи са организирани във вътрешен кръгов буфер. Дълбочината на записа на всички исторически събития е 15. Това означава, че електромерът винаги съхранява последните 15 събития. Всички събития - текущи и исторически могат да бъдат прочетени през оптичен комуникационен порт. При четенето историческите записи се подреждат от най-новите към най-старите. Всички исторически записи имат добавен суфикс (-XX) към техния оригинален OBIS код. Най-новите записи имат най-малък суфикс "-01", докато най-старите имат най-голям суфикс "-15". Типовете на събитията са описани по-долу.

Приложение 1.11

13.1. Събития от външни задействане

Има 3 типа – два електрически и един не-електрически. Електрическите събития са:

13.1.1. Електрически задействани външни събития

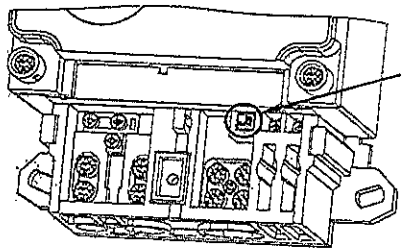
13.1.1.1. Максимална активна средна мощност за период от 15 минути.

Електромерът измерва и изчислява постоянно, консумираната и генерирана активна мощност. На всеки 15 min (вътрешен интервал от време) електромерът изчислява текущата активна средна мощност за последните 15 минути време и я сравнява с най-голямата активна средна мощност за текущия месец. Ако текущата активна средна мощност е по-голяма от предишната, електромерът приема тази стойност като нов максимум и създава временен запис с времева маркировка. Когато календарът достигне нов месец, електромерът създава нов запис за мощност с най-голямата измерена стойност на активната средна мощност за последния месец. Ако електромерът се захранва, той създава този тип запис на 1-во число на месеца в 0.00 часа и той се съхранява във вътрешната NV памет. Ако електромерът не се захранва в този момент, записът ще бъде създаден при следващото включване.

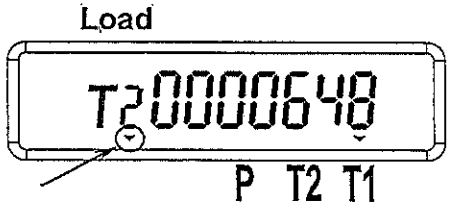
13.1.1.2. Регистриране на спад на напрежението в захранвашата мрежа

13.1.2. Не-електрическо външно задействано събитие е отваряне на капака на клемореда

Отварянето на капака на клемореда се установява чрез ключ, монтиран върху клемореда, под капака на клемореда, показан на Фиг.8 по-долу. Отварянето на този капак дава достъп за задаване на някои параметри на електромера чрез оптичен комуникационен интерфейс. Това състояние се показва на дисплея със стрелка, показана на фиг.9. Всеки път, когато капакът се отваря, електромерът създава запис на "събитие на капака на клемореда" с времева маркировка. Този запис може да се прочете през оптичения комуникационен интерфейс.
OBIS кодът на този запис е: 82.8.1-xx(YYMMDDHHMM)



Фиг.8 Ключ за детектиране на отварянето на капака на клемората



Фиг.9 Индикация на състояние „Достъп за параметризация"

ПРИЛОЖЕНИЕ 1.12а

ДЕКЛАРАЦИЯ ЗА СТАБИЛНОСТ НА МЕТРОЛОГИЧНИТЕ ПАРАМЕТРИ И НАДЕЖДНОСТ НА ЕЛЕКТРОМЕРА

Тип електромер: **Daisy IVEL 3CFC**

1. Стабилност на метрологичните параметри

Електромерът Daisy IVEL 3CFC е проектиран от Дейзи Технолоджи ЕООД така, че да поддържа стабилността на метрологичните характеристики за определения клас на точност за повече от 15 години при условие, че е инсталиран и използван съгласно инструкциите на производителя дефиниращ средата и условията на експлоатация. Конструкцията на електромера е основана на експертния опит и дългогодишната практика в производството на еднофазни електромери, като изчисленията за живота и надежността на устройството са доказани в "Reliability report Daisy IVEL 3CFC".

2. Надеждност

Електромерът Daisy IVEL 3CFC е проектиран от „Дейзи Технолоджи" ЕООД в съответствие със стандарт EN 62059-41 (Променливотокови уреди за измерване на електрическа енергия - Надежност - Част 41: Прогнозирана безотказност). Проектирането на измервателния уред е подкрепено от анализ на качеството и надеждността, в който са взети под внимание живота и надеждността на всички значими компоненти.

София 10.10.2017

.....

Инж. Славчо Христов Тороманов
управител на „Дейзи Технолоджи" ЕООД

Daisy Technology Ltd, 15-17 Tintyava Str., Izgrev, Sofia 1113, Bulgaria
Tel: +359 / 2 868 11 66, Fax : +359 / 2 962 42 22

Всички продукти на „Дейзи Технолоджи"ЕООД са конструирани и произведени в съответствие със системата за управление на качеството EN ISO 9001:2008.
„Дейзи Технолоджи"ЕООД е сертифицирана по ISO 9001:2008 от „ASTRAIA Certification s.r.o." със Сертификат. No: QMS-2479-2015 от 12.01.2015

ISO 9001 Документ № 70502, Версия : 4/11.10.2017

ЕС ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Производител

"Дейзи Технолоджи„ ЕООД			
Адрес	1113 София, България, кв.Изгрев. ул.Тинтява 15-17		
Телефон	+359 2 9607117	Факс	+359 2 9624222
Сайт	www.daisytechbg.com	E-mail	info@daisytechbg.com

Декларацията се издава за следните серийни номера от № .....

Декларираме,че следния продукт :

Наименование
"Daisy IVEL 3CFC" Еднофазен, статичен електромер за активна енергия с интегриран тарифен часовников превключвател

Със следните серийни номера :

Отговаря на следните Европейски директиви

Референтен №	Наименование
2014/32/EU	Directive on the harmonization of the laws of the Member States relating to the making available on the market of measuring instruments

Отговаря на следните Европейски стандарти

Стандарт	Наименование
EN 50470-1:2006	Electricity metering equipment (a.c.) Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)
EN 50470-3:2006	Electricity metering equipment (a.c.) Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)

Европейски сертификати удостоверяващи типа средства за измерване:	**TCM 221/16-5351, Annex 2 (Module B) SK09-013 D, Rev 5, (Module D)**
Системата за управление на качеството е одобрена и наблюдавана от:	**Slovenska legalna metrologia n.o., Banska Bystrica, Slovakia, NB No: 1432 SK 09 - 013D**

Година на поставяне на маркировката за съответствие : .....

София
Дата: 11.10.2017

_____/подпис
Миглена Михайлова /Специалист,
технически контрол и
Отговорник по МИД/

Всички продукти на „Дейзи Технолоджи"ЕООД са конструирани и произведени в съответствие със системата за управление на качеството EN ISO 9001:2008.
„Дейзи Технолоджи"ЕООД е сертифицирана по ISO 9001:2008 от „ASTRAIA Certification s.r.o." със Сертификат. No: QMS-2479-2015 от 12.01.2015

ISO 9001 Документ № 70502, Версия : 4/11.10.2017

ЕС ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Производител

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Телефон	+359 2 9607117	Факс	+359 2 9624222
Сайт	www.daisytechbg.com	E-mail	info@daisytechbg.com

Декларацията се издава за следните серийни номера от № .....

Декларираме,че следния продукт :

Наименование
"Daisy IVEL 3CFC-S" Еднофазен, статичен електромер за активна енергия с интегриран тарифен часовников превключвател

Със следните серийни номера :

Отговаря на следните Европейски директиви

Референтен №	Наименование
2014/32/EU	Directive on the harmonization of the laws of the Member States relating to the making available on the market of measuring instruments

Отговаря на следните Европейски стандарти

Стандарт	Наименование
EN 50470-1:2006	Electricity metering equipment (a.c.) Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)
EN 50470-3:2006	Electricity metering equipment (a.c.) Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)

Европейски сертификати удостоверяващи типа средства за измерване:	**TCM 221/16-5351, Annex 2 (Module B) SK09-013 D, Rev 5, (Module D)**
Системата за управление на качеството е одобрена и наблюдавана от:	**Slovenska legalna metrologia n.o., Banska Bystrica, Slovakia, NB No: 1432 SK 09 - 013D**

Година на поставяне на маркировката за съответствие : .....

София
Дата: 11.01.2017

/подпис
Миглена Михайлова /Специалист, технически контрол и Отговорник по МИД/

Český metrologický institut
Notifikovaná osoba č. 1383
Okružní 31, 638 00 Brno, Czech Republic
tel. +420 545 555 111, fax +420 545 222 728
www.cmi.cz

V:3112

CERTIFIKÁT ES PŘEZKOUŠENÍ TYPU

číslo: TCM 221/16 – 5351

Ve shodě: se Směrnicí Evropského parlamentu a Rady 2004/22/ES v platném znění implementovanou v České republice nařízením vlády č. 464/2005 Sb. v platném znění, kterým se stanoví technické požadavky na měřidla.

Výrobce: Daisy Technology Ltd.
15-17 Tintlava
1113 Izgrev
Sofia, Bulharsko

Pro: elektroměr k měření činné energie – jednofázový
typ Daisy IVEL 3CFC
třída přesnosti: A
třída mechanického prostředí: M1
třída elektromagnetického prostředí: E2
teplotní rozsah: -40°C ... +70°C

Platnost do: 3. ledna 2026

Číslo dokumentu: 0511-CS-C002-16

Popis měřidla: Základní charakteristiky, schválené podmínky a speciální podmínky, jsou-li nějaké, jsou popsány v certifikátu.

Datum vystavení: 4. ledna 2016

Certifikát schválil:

Český metrologický institut NOTIFIKOVANÁ OSOBA 1383 AO 250 2

RNDr. Pavel Klenovský

1. Charakteristika měřidla

Elektroměry Daisy IVEL 3CFC jsou jednofázové jednotarifní nebo dvoutarifní činné elektroměry pro měření energie v obytných a obchodních prostorách a v lehkém průmyslu. Elektroměry jsou určeny pro přímé zapojení do 2-vodičové rozvodné sítě. Měří činnou energii ve třídě A v obou směrech, tj. odběr i dodávku.

Tarify jsou řízeny externím napětím. Měřená energie, tj. celkový činný odběr a odběry v každém ze 2 tarifů, je ukládána do paměti spolu s dalšími informacemi, jako je čas načítání do registrů, otevření krytu svorkovnice elektroměru, počet poklesů a přerušení napětí.

Elektroměry Daisy IVEL 3CFC měří profil poklesů a přerušení napětí.

Na displeji (LCD s podsvětlením) se zobrazují naměřené hodnoty, indikace aktuálního tarifu, indikace dodávky (exportu) energie, čas a datum interních hodin, stav baterie a bargraf orientačně ukazující aktuální výkon. Údaje na displeji automaticky rotují.

Elektroměr je možné přepnout povelem přes rozhraní do zkušebního režimu. Rozlišení displeje je pak zvýšeno na 3 desetinná místa (ale viditelný počet míst před desetinnou čárkou je 4).

Elektroměr je standardně opatřen optickým komunikačním rozhraním.

Verze hardware: 1.00
Verze software: 01.151031; CRC: CEC7
Na displeji elektroměru Daisy IVEL 3CFC se ukáže na několik sekund identifikace SW a jeho CRC po připojení na napětí sítě ve formátu Sxx cxxxx, kde S znamená verzi SW a c znamená kontrolní součet.

2. Základní metrologické charakteristiky

Měření	Činná energie v 1-fázové 2-vodičové rozvodné síti, přímé zapojení do sítě, měření jak odběru, tak dodávky energie
Měřicí metoda	Statický elektroměr s proudovým bočníkem na proudovém vstupu
Třída	A
Tarify	Max. 2 tarify; externí přepínání
Počitadlo	LCD; údaje automaticky rotují; možnost zobrazení i bez připojení na napětí (pokud je lithiová baterie nainstalovaná); Zobrazení energie na displeji: $A_{T1/T2} = \lvert+A\rvert$ ($A_{T1/T2}$ součet obou tarifů ve směru odběru energie). $A_P = \lvert-A\rvert$ (celková dodávka energie) (Odečet přes interface: jsou použity OBIS kódy)
Referenční napětí U_n	230 V
Referenční kmitočet f_n	50 Hz
Referenční proud I_{ref}	5 A
Přechodový proud I_{tr}	0,5 A
Minimální proud I_{min}	0,25 A
Náběhový proud I_{st}	15 mA
Maximální proud I_{max}	40 A
konstanta (LED):	10 000 imp / kWh
Stanovený pracovní rozsah teploty	-40°C ...+70°C
Krytí	IP51
Třída ochrany (elektrická)	II
Mechanické prostředí	M1
Elektromagnetické prostředí	E2

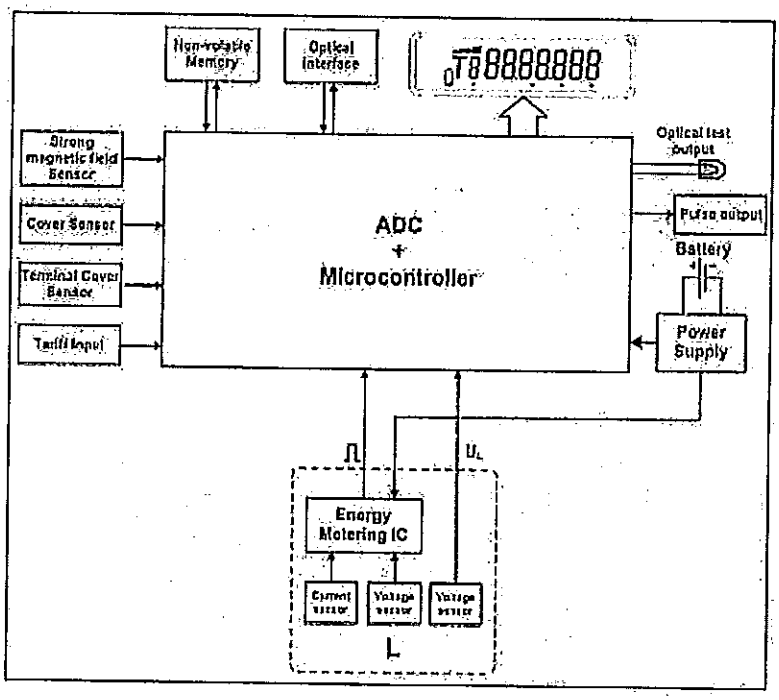
3. Rozhraní

- optické rozhraní (podle ČSN EN 62056-21, Protokol C, rychlost – do 38 400 bps)

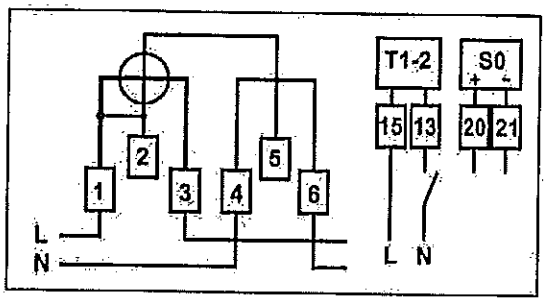
4. Základní funkční charakteristiky

- Max. 2 tarify
- Záznam počtu poklesů a přerušení napětí
- Upozornění na nesprávné připojení
- Schopnost zobrazení energie na 3 desetinná místa
- Samodiagnostika

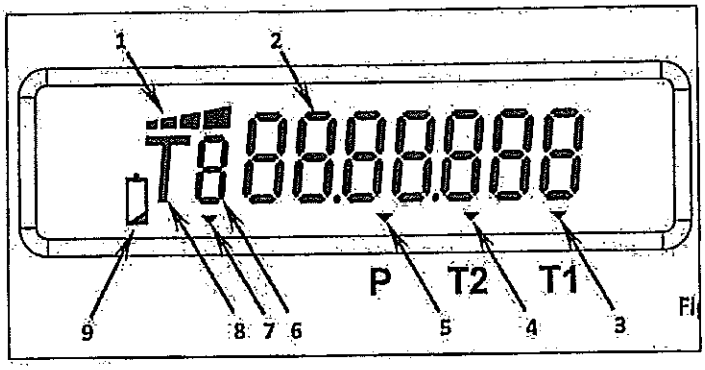
5. Blokové schéma elektroměru



6a. Schéma připojení

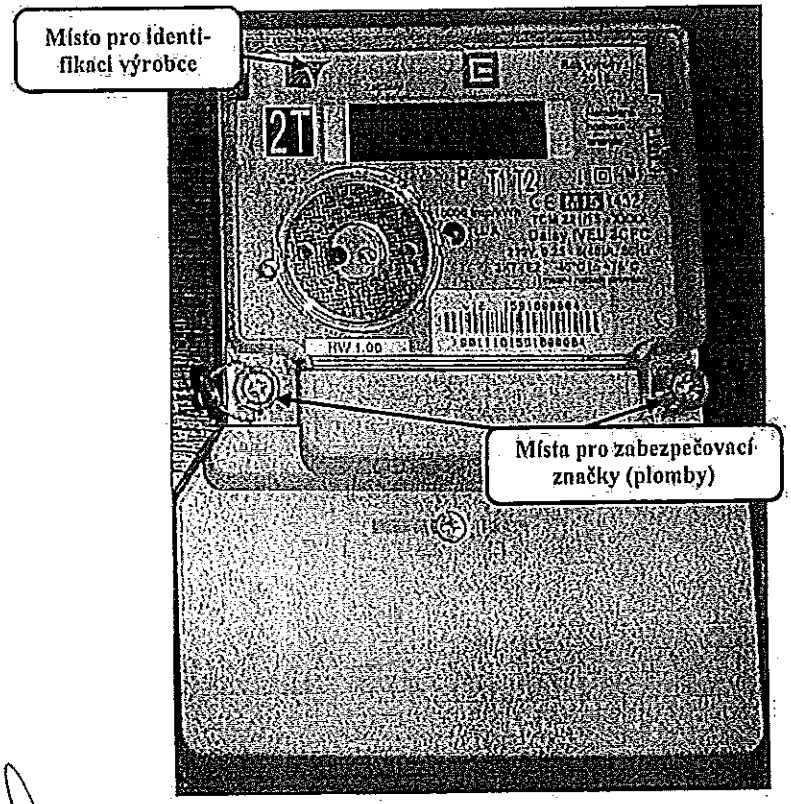


6b. Symboly na LCD



Pořadí	Popis
1	indikace velikosti zátěže
2	naměřené hodnoty
3	indikace aktivního tarifu T1
4	indikace aktivního tarifu T2
5	indikace opačného směru toku energie (dodávka energie)
6	indikace zobrazeného registru energie
7	Symbol pro povolení parametrizace
8	symbol pro tarif
9	indikace stavu baterie

7. Fotografie elektroměru



8. Typová zkouška

Vzorky elektroměrů byly zkoušeny v ČMI Brno podle norem ČSN EN 50470-1:2006 a ČSN EN 50470-3:2006 a dokumentu WELMEC doc. 7.2, Issue 5. Výsledky jsou uvedeny ve zkušebním protokolu č. 6011-PT-TS001-16.

Elektroměry vyhověly všem zkoušeným požadavkům.

9. Označování elektroměrů

9.1 Identifikační štítek

Na identifikačním štítku musí být uvedeny tyto údaje:

- Název výrobce nebo jeho obchodní značka
- Označení typu
- Značka shody "CE" a doplňkové metrologické značení
- Číslo certifikátu ES přezkoušení typu
- Výrobní číslo a rok výroby
- Označení třídy elektroměru
- Stanovený pracovní rozsah teploty
- Typ rozvodné sítě (grafický symbol)
- Referenční napětí
- Referenční kmitočet
- Minimální proud
- Referenční proud
- Maximální proud
- Konstanta elektroměru
- Značka dvojitého čtverce pro celoizolovaný elektroměr třídy ochrany II

9.2 Doprovodná dokumentace

K elektroměru musí být přiložena doprovodná dokumentace. V případě dodávky identických elektroměrů jednomu odběrateli postačuje jeden výtisk doprovodné dokumentace pro celou dodávku. Tato dokumentace musí minimálně obsahovat údaje uvedené v čl. 9.1 (mimo výrobní číslo a rok výroby) a dále:

- Stručný popis elektroměru včetně údajů o měřených veličinách, jejich ukládání do paměti a možností jejich zobrazení
- Schéma zapojení svorkovnice (schéma zapojení musí být rovněž vyznačeno na elektroměru)
- Skladovací podmínky
- Údaje o elektromagnetické kompatibilitě
- Náběhový proud
- Vlastní spotřeba napěťového a proudového obvodu
- Specifikace komunikačního rozhraní
- Specifikace interního kalendáře a ovládání tarifů
- Maximální průřez připojovacích vodičů
- Hmotnost a rozměry
- Způsob likvidace elektroměru

9.3 Zajišťovací značky

Elektroměr je opatřen dvěma zajišťovacími značkami. Tyto značky mají formu závěsných plomb. Jejich umístění - viz fotografie elektroměru.

10. Zkouška pro posouzení shody s typem

Při zkoušce shody s typem se provedou v referenčních podmínkách minimálně tyto zkoušky:

1. Chod naprázdno
2. Náběh
3. Chyby elektroměru pomocí zkušebního výstupu
4. Kontrola konstanty (číselníku)

Postupuje se podle norem ČSN EN 50470-1 a ČSN EN 50470-3. Základní chyby elektroměru v referenčních podmínkách se měří při referenčním napětí 230 V, 50 Hz a při proudech a cosφ uvedených v tabulce. Po zkoušce se vypočítají složené chyby e_c (použijí se hodnoty přídavných chyb $\delta(T,I,\cos\varphi)$, $\delta(U,I,\cos\varphi)$ and $\delta(f,I,\cos\varphi)$ z níže uvedené tabulky) ve stanovených pracovních podmínkách elektroměru podle vztahu

$$e_c = \sqrt{e^2(I,\cos\varphi) + \delta^2(T,I,\cos\varphi) + \delta^2(U,I,\cos\varphi) + \delta^2(f,I,\cos\varphi)}$$

kde

$e(I,\cos\varphi)$ je základní chyba elektroměru při daném proudu a cosφ;

$\delta(T,I,\cos\varphi)$ je přídavná relativní chyba v důsledku změny teploty ve stanoveném pracovním rozsahu při daném proudu a cosφ;

$\delta(U,I,\cos\varphi)$ je přídavná relativní chyba v důsledku změny napětí ±10 %U_{ref} při daném proudu a cosφ;

$\delta(f,I,\cos\varphi)$ je přídavná relativní chyba v důsledku změny kmitočtu ±2 % f_{ref} při daném proudu a cosφ.

Elektroměr je vyhovující, pokud jsou složené chyby menší než největší dovolené chyby MPE v tabulce.

Údaje pro výpočet složené chyby											
Zátěž		Přídavná chyba (%)						Největší dovolená chyba (%). MPE pro třídu A v teplotním rozsahu			
Proud	cosφ	δ(T,I,cosφ)				δ (U,I,cosφ)	δ (f,I,cosφ)				
		1	2	3	4			1	2	3	4
I_{min}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±5,0	±3,5
I_t	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±4,5	±3,5
	0,5ind.	2,5	1,9	1,2	0,7	0,2	0,2				
	0,8cap.	2,5	1,9	1,2	0,7	0,2	0,2				
I_{ref}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±4,5	±3,5
	0,5ind.	2,5	1,9	1,2	0,7	0,2	0,2				
	0,8cap.	2,5	1,9	1,2	0,7	0,2	0,2				
I_{max}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±4,5	±3,5
	0,5ind.	2,5	1,9	1,2	0,7	0,2	0,2				
	0,8cap.	2,5	1,9	1,2	0,7	0,2	0,2				

Teplotní rozsah 1: +5 °C...+30 °C
Teplotní rozsah 2: -10 °C...+5 °C a +30 °C...+40 °C
Teplotní rozsah 3: -25 °C...-10 °C a +40°C...+55 °C
Teplotní rozsah 4: -40 °C...-25 °C a ...+55 °C ...+70 °C

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CERTIFIKÁT EU PŘEZKOUŠENÍ TYPU

číslo: TCM 221/16 - 5351

Dodatek 1

Tento dodatek nahrazuje všechny předchozí verze tohoto certifikátu v plném znění.

Ve shodě: se Směrnicí Evropského parlamentu a Rady 2014/32/EU o harmonizaci právních předpisů členských států týkajících se dodávání měřidel na trh (implementovanou v České republice nařízením vlády č. 120/2016 Sb.).

Výrobce: Daisy Technology Ltd.
15-17 Tintiava
1113 Izgrev
Sofia, Bulharsko

Pro: elektroměr k měření činné energie - jednofázový
typ: Daisy IVEL 3CFC
třída přesnosti: A
třída mechanického prostředí: M1
třída elektromagnetického prostředí: E2
teplotní rozsah: -40°C..,+70°C

Platnost do: 3. ledna 2026

Číslo dokumentu: 0511-CS-C002-16

Popis měřidla: Základní charakteristiky, schválené podmínky a speciální podmínky, jsou-li nějaké, jsou popsány v tomto certifikátu.

Datum vystavení: 20. června 2016

Certifikát schválil:

Český metrologický institut
-3-

RNDr. Pavel Klenovský

1. Charakteristika měřidla

Elektroměry Daisy IVEL 3CFC jsou jednofázové jednotarifní nebo dvoutarifní činné elektroměry pro měření energie v obytných a obchodních prostorách a v lehkém průmyslu. Elektroměry jsou určeny pro přímé zapojení do 2-vodičové rozvodné sítě. Měří činnou energii ve třídě A v obou směrech, tj. odběr i dodávku.

Tarify jsou řízeny externím napětím. Měřená energie, tj. celkový činný odběr a odběry v každém ze 2 tarifů, je ukládána do paměti spolu s dalšími informacemi, jako je čas načítání do registrů, otevření krytu svorkovnice elektroměru, počet poklesů a přerušení napětí.

Elektroměry Daisy IVEL 3CFC měří profil poklesů a přerušení napětí.

Na displeji (LCD s podsvětlením) se zobrazují naměřené hodnoty, indikace aktuálního tarifu, indikace dodávky (exportu) energie, čas a datum interních hodin, stav baterie a bargraf orientačně ukazující aktuální výkon. Údaje na displeji automaticky rotují.

Elektroměr je možné přepnout povelem přes rozhraní do zkušebního režimu. Rozlišení displeje je pak zvýšeno na 3 desetinná místa (ale viditelný počet míst před desetinnou čárkou je 4).

Elektroměr je standardně opatřen optickým komunikačním rozhraním.

Verze hardware: 1.00
Verze software: 01,151031; CRC: CEC7
02,160315; CRC: 0EE8

Na displeji elektroměru Daisy IVEL 3CFC se ukáže na několik sekund identifikace SW a jeho CRC po připojení na napětí sítě ve formátu Sxx cxxxx, kde S znamená verzi SW a c znamená kontrolní součet.

2. Základní metrologické charakteristiky

Měření	Činná energie v 1-fázové 2-vodičové rozvodné síti, přímé zapojení do sítě, měření jak odběru, tak dodávky energie
Měřicí metoda	Statický elektroměr s proudovým bočníkem na proudovém vstupu
Třída	A
Tarify	Max. 2 tarify; externí přepínání
Počitadlo	LCD; údaje automaticky rotují; možnost zobrazení i bez připojení na napětí (pokud je lithiová baterie nainstalovaná); Zobrazení energie na displeji: $A_{T1/T2} = \|+A\|$ ($A_{T1/T2}$ součet obou tarifů ve směru odběru energie). $A_P = \|-A\|$ (celková dodávka energie) (Odečet přes interface: jsou použity OBIS kódy)
Referenční napětí U_n	230 V
Referenční kmitočet f_n	50 Hz
Referenční proud I_{ref}	5 A
Přechodový proud I_{tr}	0,5 A
Minimální proud I_{min}	0,25 A
Náběhový proud I_{st}	15 mA
Maximální proud I_{max}	40 A
konstanta (LED):	10 000 imp / kWh
Stanovený pracovní rozsah teploty	-40°C ... +70°C
Krytí	IP51
Třída ochrany (elektrická)	II

Český metrologický institut
V 16-002

Mechanické prostředí	M1
Elektromagnetické prostředí	E2

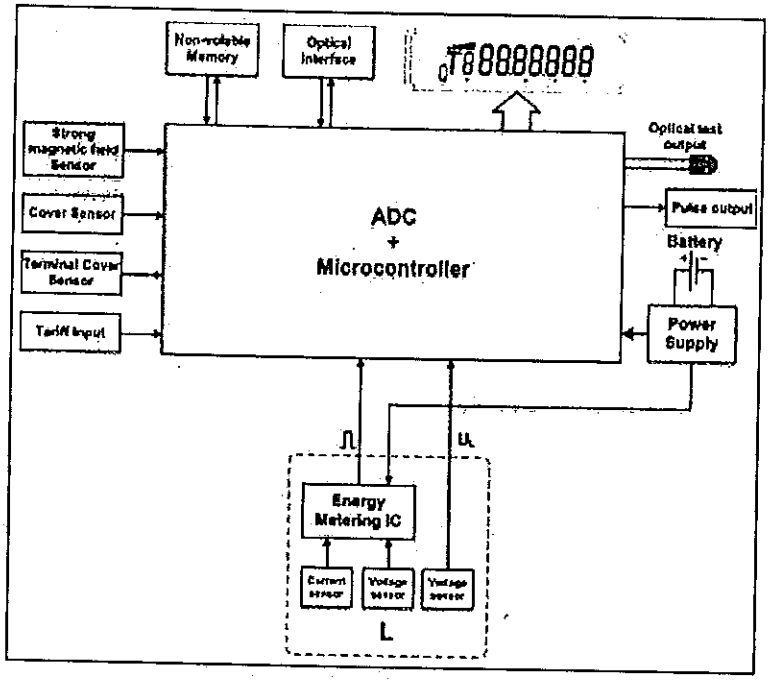
3. Rozhraní

- optické rozhraní (podle ČSN EN 62056-21, Protokol C, rychlost – do 38 400 bps)

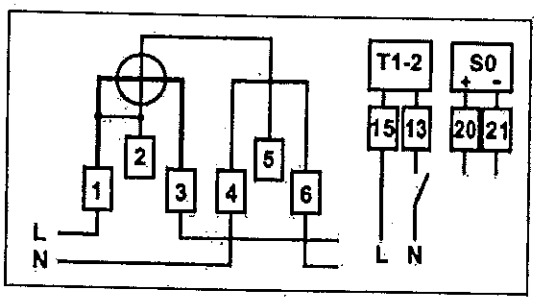
4. Základní funkční charakteristiky

- Max. 2 tarify
- Záznam počtu poklesů a přerušení napětí
- Upozornění na nesprávné připojení
- Schopnost zobrazení energie na 3 desetinná místa
- Samodiagnostika

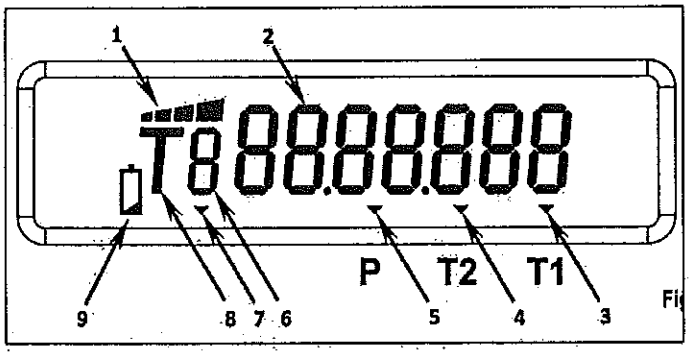
5. Blokové schéma elektroměru



6a. Schéma připojení

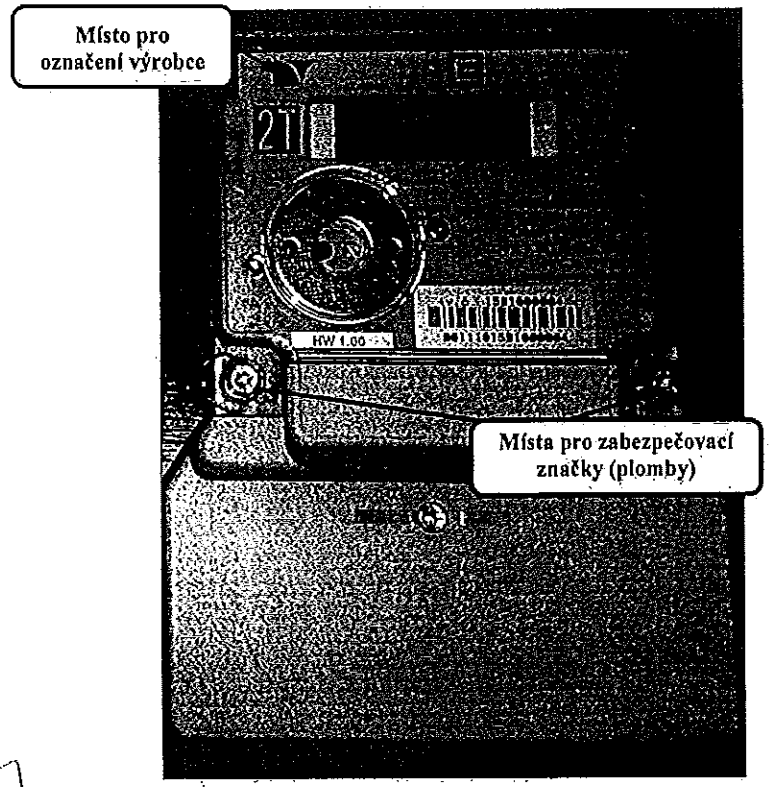


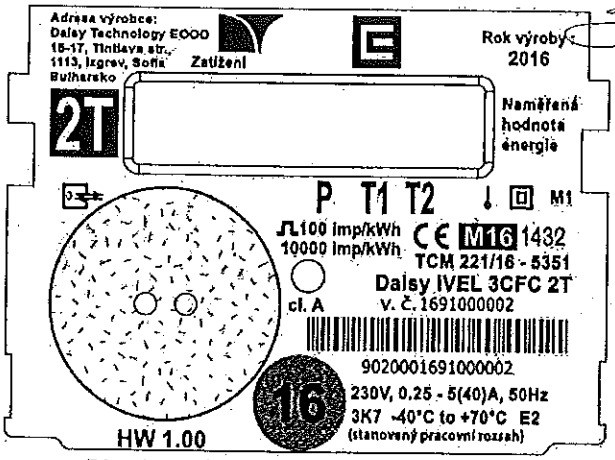
6b. Symboly na LCD



Pořadí	Popis
1	indikace velikosti zátěže
2	naměřené hodnoty
3	indikace aktivního tarifu T1
4	indikace aktivního tarifu T2
5	indikace opačného směru toku energie (dodávka energie)
6	indikace zobrazeného registru energie
7	Symbol pro povolení parametrizace
8	symbol pro tarif
9	indikace stavu baterie

7. Fotografie elektroměru





Identifikační štítek s adresou výrobce

8. Typová zkouška

Vzorky elektroměrů byly zkoušeny v ČMI Brno podle norem ČSN EN 50470-1:2006 a ČSN EN 50470-3:2006 a dokumentu WELMEC doc. 7.2, Issue 5. Výsledky jsou uvedeny ve zkušebním protokolu č. 6011-PT-TS001-16 a č. 6011-PT-TS017-16.

Elektroměry vyhověly všem zkoušeným požadavkům.

9. Označování elektroměrů

9.1 Identifikační štítek

Na identifikačním štítku musí být uvedeny tyto údaje:

- Název výrobce nebo jeho obchodní značka
- Adresa výrobce
- Označení typu
- Značka shody "CE" a doplňkové metrologické značení
- Číslo certifikátu ES přezkoušení typu
- Výrobní číslo a rok výroby
- Označení třídy elektroměru
- Stanovený pracovní rozsah teploty
- Typ rozvodné sítě (grafický symbol)
- Referenční napětí
- Referenční kmitočet
- Minimální proud
- Referenční proud
- Maximální proud
- Konstanta elektroměru
- Značka dvojitého čtverce pro celoizolovaný elektroměr třídy ochrany II

9.2 Doprovodná dokumentace

K elektroměru musí být přiložena doprovodná dokumentace. V případě dodávky identických elektroměrů jednomu odběrateli postačuje jeden výtisk doprovodné dokumentace pro celou dodávku. Tato dokumentace musí minimálně obsahovat údaje uvedené v čl. 9.1 (mimo výrobní číslo a rok výroby) a dále:

- Stručný popis elektroměru včetně údajů o měřených veličinách, jejich ukládání do paměti a možností jejich zobrazení
- Schéma zapojení svorkovnice (schéma zapojení musí být rovněž vyznačeno na elektroměru)
- Skladovací podmínky
- Údaje o elektromagnetické kompatibilitě
- Náběhový proud
- Vlastní spotřeba napěťového a proudového obvodu

- Specifikace komunikačního rozhraní
- Specifikace interního kalendáře a ovládání tarifů
- Maximální průřez připojovacích vodičů
- Hmotnost a rozměry
- Způsob likvidace elektroměru

9.3 Zajišťovací značky

Elektroměr je opatřen dvěma zajišťovacími značkami. Tyto značky mají formu závěsných plomb. Jejich umístění - viz fotografie elektroměru.

10. Zkouška pro posouzení shody s typem

Při zkoušce shody s typem se provedou v referenčních podmínkách minimálně tyto zkoušky:

1. Chod naprázdno
2. Náběh
3. Chyby elektroměru pomocí zkušebního výstupu
4. Kontrola konstanty (číselníku)

Postupuje se podle norem ČSN EN 50470-1 a ČSN EN 50470-3. Základní chyby elektroměru v referenčních podmínkách se měří při referenčním napětí 230 V, 50 Hz a při proudech a cosφ uvedených v tabulce. Po zkoušce se vypočítají složené chyby e_c (použijí se hodnoty přídavných chyb $\delta(T,I,\cos\varphi)$, $\delta(U,I,\cos\varphi)$ and $\delta(f,I,\cos\varphi)$ z níže uvedené tabulky) ve stanovených pracovních podmínkách elektroměru podle vztahu

$$e_c = \sqrt{e^2(I,\cos\varphi) + \delta^2(T,I,\cos\varphi) + \delta^2(U,I,\cos\varphi) + \delta^2(f,I,\cos\varphi)}$$

kde

$e(I,\cos\varphi)$ je základní chyba elektroměru při daném proudu a cosφ;

$\delta(T,I,\cos\varphi)$ je přídavná relativní chyba v důsledku změny teploty ve stanoveném pracovním rozsahu při daném proudu a cosφ;

$\delta(U,I,\cos\varphi)$ je přídavná relativní chyba v důsledku změny napětí ±10 %U_{ref} při daném proudu a cosφ;

$\delta(f,I,\cos\varphi)$ je přídavná relativní chyba v důsledku změny kmitočtu ±2 % f_{ref} při daném proudu a cosφ.

Elektroměr je vyhovující, pokud jsou složené chyby menší než největší dovolené chyby MPE v tabulce.

Údaje pro výpočet složené chyby												
Zátěž		Přídavná chyba (%)						Největší dovolená chyba (%) MPE pro třídu A v teplotním rozsahu			
Proud	cosφ	δ(T,I,cosφ)				δ (U,I,cosφ)	δ (f,I,cosφ)				
		1	2	3	4			1	2	3	4
I_{min}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±5,0	±3,5
I_{tr}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±4,5	±3,5
	0,5ind.	2,5	1,9	1,2	0,7	0,2	0,2				
	0,8cap.	2,5	1,9	1,2	0,7	0,2	0,2				
I_{ref}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±4,5	±3,5
	0,5ind.	2,5	1,9	1,2	0,7	0,2	0,2				
	0,8cap.	2,5	1,9	1,2	0,7	0,2	0,2				
I_{max}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±4,5	±3,5
	0,5ind.	2,5	1,9	1,2	0,7	0,2	0,2				
	0,8cap.	2,5	1,9	1,2	0,7	0,2	0,2				

Teplotní rozsah 1: +5 °C...+30 °C
Teplotní rozsah 2: -10 °C...+5 °C a +30 °C...+40 °C
Teplotní rozsah 3: -25 °C...-10 °C a +40°C...+55 °C
Teplotní rozsah 4: -40 °C...--25 °C a ...+55 °C ...+70 °C

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číslo: TCM 221/16 - 5351

Dodatek 2

Tento dodatek nahrazuje všechny předchozí verze tohoto certifikátu v plném znění.

Ve shodě: se Směrnicí Evropského parlamentu a Rady 2014/32/EU o harmonizaci právních předpisů členských států týkajících se dodávání měřidel na trh (implementovanou v České republice nařízením vlády č. 120/2016 Sb.).

Výrobce: Daisy Technology Ltd.
15-17 Tintiava
1113 Izgrev
Sofia, Bulharsko

Pro: elektroměr k měření činné energie - jednofázový

typ: Daisy IVEL 3CFC

třída přesnosti: A

třída mechanického prostředí: M1

třída elektromagnetického prostředí: E2

teplotní rozsah: -40°C...+70°C

Platnost do: 3. ledna 2026

Číslo dokumentu: 0511-CS-C002-16

Popis měřidla: Základní charakteristiky, schválené podmínky a speciální podmínky, jsou-li nějaké, jsou popsány v tomto certifikátu.

Datum vystavení: 11. října 2017

Certifikát schválil:

Český metrologický institut

RNDr. Pavel Klenovský

1. Charakteristika měřidla

Elektroměry Daisy IVEL 3CFC jsou jednofázové jednotarifní nebo dvoutarifní činné elektroměry pro měření energie v obytných a obchodních prostorách a v lehkém průmyslu. Elektroměry jsou určeny pro přímé zapojení do 2-vodičové rozvodné sítě. Měří činnou energii ve třídě A v obou směrech, tj. odběr i dodávku.

Tarify jsou řízeny externím napětím. Měřená energie, tj. celkový činný odběr a odběry v každém ze 2 tarifů, je ukládána do paměti spolu s dalšími informacemi, jako je čas načítání do registrů, otevření krytu svorkovnice elektroměru, počet poklesů a přerušení napětí.

Elektroměry Daisy IVEL 3CFC měří profil poklesů a přerušení napětí.

Na displeji (LCD s podsvětlením) se zobrazují naměřené hodnoty, indikace aktuálního tarifu, indikace dodávky (exportu) energie, čas a datum interních hodin, stav baterie a bargraf orientačně ukazující aktuální výkon. Údaje na displeji automaticky rotují.

Elektroměr je možné přepnout povelem přes rozhraní do zkušebního režimu. Rozlišení displeje je pak zvýšeno na 3 desetinná místa (ale viditelný počet míst před desetinnou čárkou je 4).

Elektroměr je standardně opatřen optickým komunikačním rozhraním.

Verze hardware: 1.00

Verze software: 01,151031; CRC: CEC7
02,160315; CRC: 0EE8
03,170927; CRC: 69B0

Na displeji elektroměru Daisy IVEL 3CFC se ukáže na několik sekund identifikace SW a jeho CRC po připojení na napětí sítě ve formátu Sxx cxxxx, kde S znamená verzi SW a c znamená kontrolní součet.

2. Základní metrologické charakteristiky

Měření	Činná energie v 1-fázové 2-vodičové rozvodné síti, přímé zapojení do sítě, měření jak odběru, tak dodávky energie
Měřicí metoda	Statický elektroměr s proudovým bočníkem na proudovém vstupu
Třída	A
Tarify	Max. 2 tarify; externí přepínání
Počitadlo	LCD; údaje automaticky rotují; možnost zobrazení i bez připojení na napětí (pokud je lithiová baterie nainstalovaná); Zobrazení energie na displeji: $A_{T1/T2} = \|+A\|$ ($A_{T1/T2}$ součet obou tarifů ve směru odběru energie). $A_P = \|-A\|$ (celková dodávka energie) $A = \|+A\|+\|-A\|$ (součet odběru a dodávky energie) (Odečet přes interface: jsou použity OBIS kódy)
Referenční napětí U_n	230 V
Referenční kmitočet f_n	50 Hz
Referenční proud I_{ref}	5 A
Přechodový proud I_{tr}	0,5 A
Minimální proud I_{min}	0,25 A
Náběhový proud I_{st}	15 mA
Maximální proud I_{max}	40 A a 60 A
konstanta (LED):	10 000 imp / kWh
Stanovený pracovní rozsah teploty	-40°C …+70°C
Krytí	IP51

Třída ochrany (elektrická)	II
Mechanické prostředí	M1
Elektromagnetické prostředí	E2

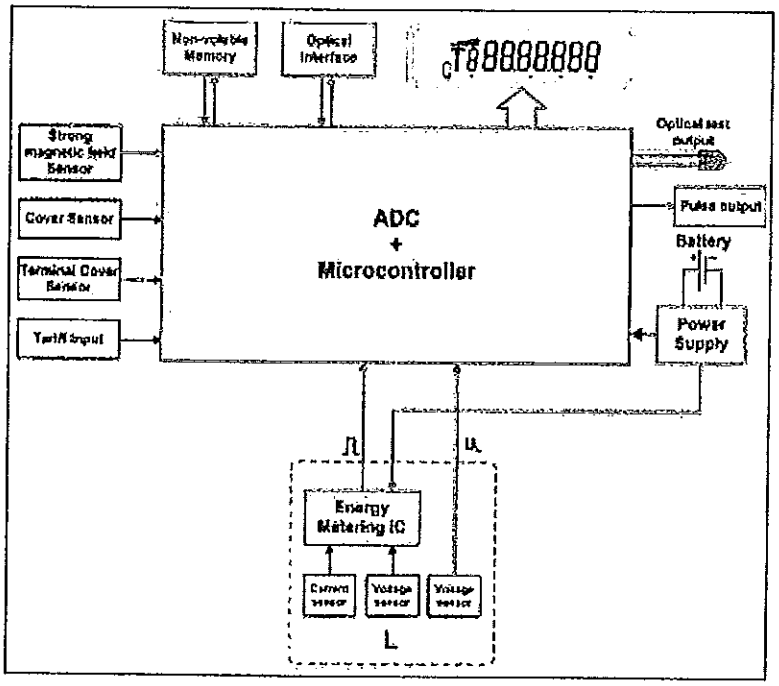
3. Rozhraní

- optické rozhraní (podle ČSN EN 62056-21, Protokol C, rychlost – do 38 400 bps)

4. Základní funkční charakteristiky

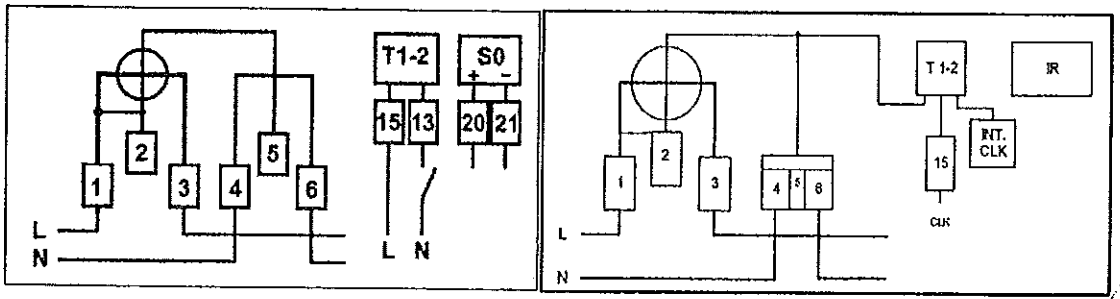
- Max. 2 tarify
- Záznam počtu poklesů a přerušení napětí
- Upozornění na nesprávné připojení
- Schopnost zobrazení energie na 3 desetinná místa
- Samodiagnostika

5. Blokové schéma elektroměru

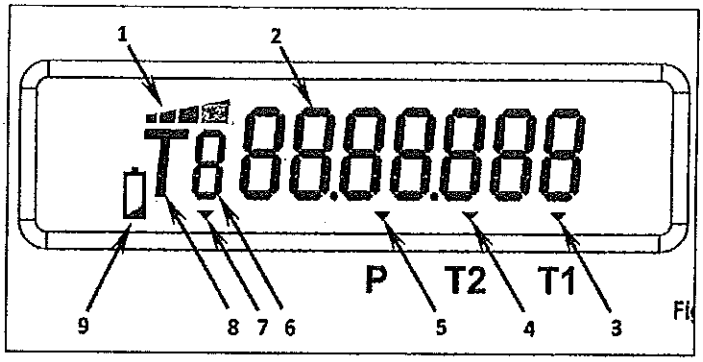


6a. Schéma připojení elektroměru (s externím přepínačem)

pro Českou republiku **pro Bulharsko**

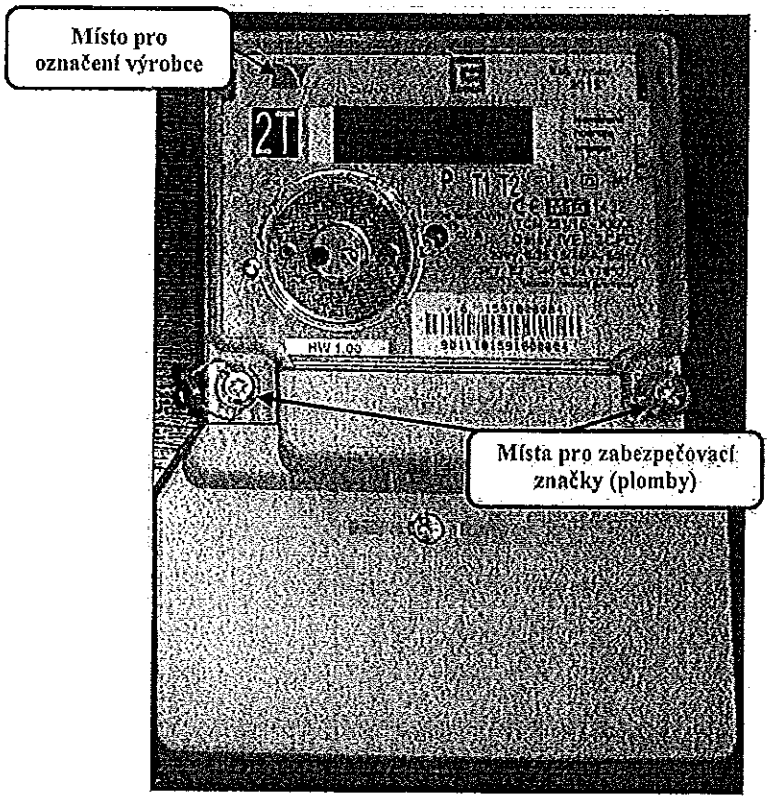


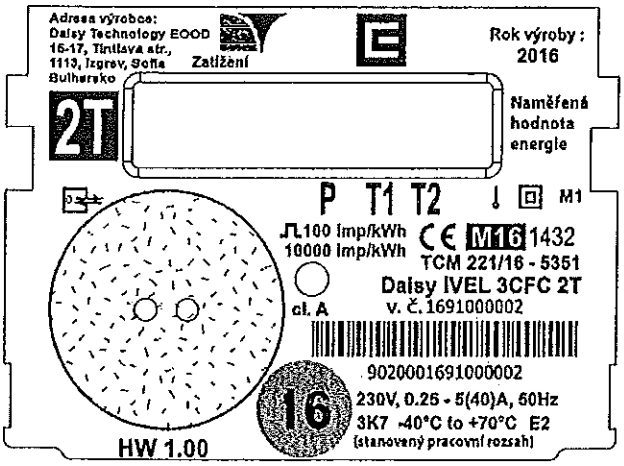
6b. Symboly na LCD



Pořadí	Popis
1	indikace velikosti zátěže
2	naměřené hodnoty
3	indikace aktivního tarifu T1
4	indikace aktivního tarifu T2
5	indikace opačného směru toku energie (dodávka energie)
6	indikace zobrazeného registru energie
7	Symbol pro povolení parametrizace
8	symbol pro tarif
9	indikace stavu baterie

7. Fotografie elektroměru





Identifikační štítek s adresou výrobce

8. Typová zkouška

Vzorky elektroměrů byly zkoušeny v ČMI Brno podle norem ČSN EN 50470-1:2006 a ČSN EN 50470-3:2006 a dokumentu WELMEC doc. 7.2, Issue 5. Výsledky jsou uvedeny ve zkušebním protokolu č. 6011-PT-TS001-16, č. 6011-PT-TS017-16 a č. 6011-PT-TS029-17.

Elektroměry vyhověly všem zkoušeným požadavkům.

9. Označování elektroměrů

9.1 Identifikační štítek

Na identifikačním štítku musí být uvedeny tyto údaje:

- Název výrobce nebo jeho obchodní značka
- Adresa výrobce
- Označení typu
- Značka shody "CE" a doplňkové metrologické značení
- Číslo certifikátu EU přezkoušení typu
- Výrobní číslo a rok výroby
- Označení třídy elektroměru
- Stanovený pracovní rozsah teploty
- Typ rozvodné sítě (grafický symbol)
- Referenční napětí
- Referenční kmitočet
- Minimální proud
- Referenční proud
- Maximální proud
- Konstanta elektroměru
- Značka dvojitého čtverce pro celoizolovaný elektroměr třídy ochrany II

9.2 Doprovodná dokumentace

K elektroměru musí být přiložena doprovodná dokumentace. V případě dodávky identických elektroměrů jednomu odběrateli postačuje jeden výtisk doprovodné dokumentace pro celou dodávku. Tato dokumentace musí minimálně obsahovat údaje uvedené v čl. 9.1 (mimo výrobní číslo a rok výroby) a dále:

- Stručný popis elektroměru včetně údajů o měřených veličinách, jejich ukládání do paměti a možností jejich zobrazení
- Schéma zapojení svorkovnice (schéma zapojení musí být rovněž vyznačeno na elektroměru)
- Skladovací podmínky
- Údaje o elektromagnetické kompatibilitě
- Náběhový proud
- Vlastní spotřeba napěťového a proudového obvodu

Český metrologický institut 16-002

- Specifikace komunikačního rozhraní
- Specifikace interního kalendáře a ovládání tarifů
- Maximální průřez připojovacích vodičů
- Hmotnost a rozměry
- Způsob likvidace elektroměru

9.3 Zajišťovací značky

Elektroměr je opatřen dvěma zajišťovacími značkami. Tyto značky mají formu závěsných plomb. Jejich umístění - viz fotografie elektroměru.

10. Zkouška pro posouzení shody s typem

Při zkoušce shody s typem se provedou v referenčních podmínkách minimálně tyto zkoušky:

1. Chod naprázdno
2. Náběh
3. Chyby elektroměru pomocí zkušebního výstupu
4. Kontrola konstanty (číselníku)

Postupuje se podle norem ČSN EN 50470-1 a ČSN EN 50470-3. Základní chyby elektroměru v referenčních podmínkách se měří při referenčním napětí 230 V, 50 Hz a při proudech a cosφ uvedených v tabulce. Po zkoušce se vypočítají složené chyby e_c (použijí se hodnoty přídavných chyb $\delta(T,I,\cos\varphi)$, $\delta(U,I,\cos\varphi)$ and $\delta(f,I,\cos\varphi)$ z níže uvedené tabulky) ve stanovených pracovních podmínkách elektroměru podle vztahu

$$e_c = \sqrt{e^2(I,\cos\varphi) + \delta^2(T,I,\cos\varphi) + \delta^2(U,I,\cos\varphi) + \delta^2(f,I,\cos\varphi)}$$

kde

$e(I,\cos\varphi)$ je základní chyba elektroměru při daném proudu a cosφ;

$\delta(T,I,\cos\varphi)$ je přídavná relativní chyba v důsledku změny teploty ve stanoveném pracovním rozsahu při daném proudu a cosφ;

$\delta(U,I,\cos\varphi)$ je přídavná relativní chyba v důsledku změny napětí ±10 %U_{ref} při daném proudu a cosφ;

$\delta(f,I,\cos\varphi)$ je přídavná relativní chyba v důsledku změny kmitočtu ±2 % f_{ref} při daném proudu a cosφ.

Elektroměr je vyhovující, pokud jsou složené chyby menší než největší dovolené chyby MPE v tabulce.

Údaje pro výpočet složené chyby												
Zátěž		Přídavná chyba (%)						Největší dovolená chyba (%) MPE pro třídu A v teplotním rozsahu			
Proud	cosφ	δ(T,I,cosφ)				δ (U,I,cosφ)	δ (f,I,cosφ)				
		1	2	3	4			1	2	3	4
I_{min}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±5,0	±3,5
I_r	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±4,5	±3,5
	0,5ind.	2,5	1,9	1,2	0,7	0,2	0,2				
	0,8cap.	2,5	1,9	1,2	0,7	0,2	0,2				
I_{tr}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±4,5	±3,5
	0,5ind.	2,5	1,9	1,2	0,7	0,2	0,2				
	0,8cap.	2,5	1,9	1,2	0,7	0,2	0,2				
I_{max}	1	2,5	1,9	1,2	0,7	0,2	0,2	±9,0	±7,0	±4,5	±3,5
	0,5ind.	2,5	1,9	1,2	0,7	0,2	0,2				
	0,8cap.	2,5	1,9	1,2	0,7	0,2	0,2				

Teplotní rozsah 1: +5 °C...+30 °C
Teplotní rozsah 2: -10 °C...+5 °C a +30 °C...+40 °C
Teplotní rozsah 3: -25 °C...-10 °C a +40°C...+55 °C
Teplotní rozsah 4: -40 °C...--25 °C a ...+55 °C ...+70 °C

Certifikát o schválení systému kvality výrobného procesu

Certificate on approval of the production process quality system

SNAS
Reg. No. 058/P-017

Číslo / *Number* **SK 09 – 013 D Rev. 6**

Tento certifikát nahrádza všetky predchádzajúce verzie ES Osvedčenia č. SK 09 – 013 D v plnom znení.
This Certificate replaces all previous versions of Approval on a quality management system No. SK 09 – 013 D in full wording.

Vydaný / *Issued by*
Slovenská legálna metrológia, n. o.
Hviezdoslavova 31
974 01 Banská Bystrica
Slovenská republika

Notifikovaná osoba / *Notified Body* **1432**

V súlade s / *In accordance with*
prílohou č. 2, Modul D k nariadeniu vlády Slovenskej republiky č. 145/2016 Z. z. o sprístupňovaní meradiel na trhu, ktorým sa transponuje smernica Európskeho parlamentu a Rady 2014/32/EU z 26. februára 2014 o harmonizácii právnych predpisov členských štátov týkajúcich sa sprístupnenia meradiel na trhu v platnom znení do právneho poriadku Slovenskej republiky (MID).
Annex II, Module D to Government Ordinance of the Slovak Republic No. 145/2016 Coll. relating to the making available on the market of measuring instruments, which implements, in Slovakia, the Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments as later amended (MID).

Výrobca / *Manufacturer*
Daisy Technology Ltd.
15-17, Tintlava str., Izgrev
1113 Sofia
Bulgaria

Žiadateľ / *Applicant* Výrobca / *Manufacturer*

Druh meradiel / *Measurement instrument category*
elektromery (MI – 003) – Príloha V k MID
active electrical energy meters (MI - 003) – Annex V to MID

Potvrdenie / *Confirmation*
Notifikovaná osoba č. 1432 týmto Certifikátom o schválení systému kvality výrobného procesu potvrdzuje, že systém kvality výrobného procesu výrobcu zabezpečuje – v rozsahu špecifikovanom v prílohe tohto certifikátu - zhodu vyrábaných meradiel s požiadavkami prílohy č. 2, Modul D k nariadeniu vlády Slovenskej republiky č. 145/2016 Z. z. o sprístupňovaní meradiel na trhu, ktorým sa transponuje smernica Európskeho parlamentu a Rady 2014/32/EU z 26. februára 2014 o harmonizácii právnych predpisov členských štátov týkajúcich sa sprístupnenia meradiel na trhu v platnom znení do právneho poriadku Slovenskej republiky (MID).
By means of this Certificate on approval of the production process quality system, the Notified Body No. 1432 confirms that the quality system of the production process of the manufacturer ensures – within the scope specified in the Annex to this Certificate – compliance of the produced measuring instruments with the requirements of the Annex II module D to Government Ordinance of the Slovak Republic No. 145/2016 Coll. relating to the making available on the market of measuring instruments, which implements, in Slovakia, the Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments as later amended (MID).

Dátum vydania / *Date of issue* 2016-12-14

Dátum počiatočného schválenia: 2009-08-20
Date of initial approval

Platný do / *Valid until* **2018-08-14**

Príloha / *Annex* 3 strany / *3 pages*

SLOVAK LEGAL METROLOGY
SLM
1432

Ing. Štefan Král, PhD.
Zástupca notifikovanej osoby
Representative of notified body

1. Rozsah Certifikátu o schválení systému kvality výrobného procesu
Scope of Certificate on approval of the production process quality system

Výrobná prevádzka (1)
Manufacturer's premise (1)

Daisy Technology Ltd.
79, Varshets str.
5700 Teteven, Bulgaria

Výrobná prevádzka (2)
Manufacturer's premise (2)

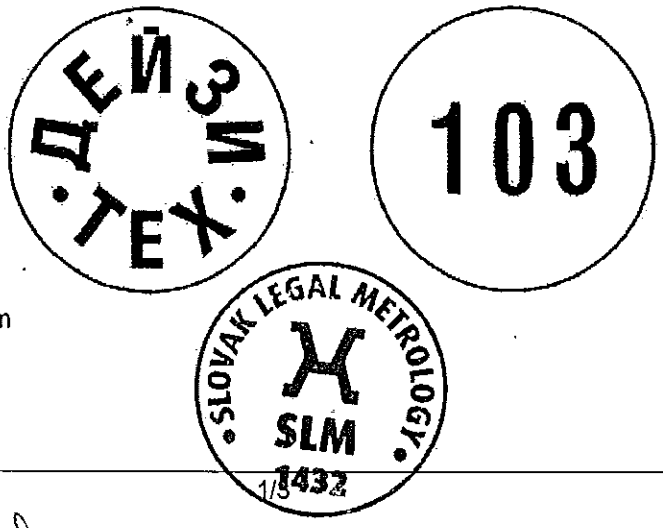
Daisy Technology Ltd.
1 Ribarska str.
5300 Gabrovo, Bulgaria

Druh meradiel
Measurement instrument category

Elektromery (MI-003), Príloha V k MID
Active electrical energy meters (MI-003), Annex V to MID

číslo *N°*	Typ *Type*	ES certifikát typu *EC-type examination certificate*	Vydal NO *issued by NB*
1	*Daisy IVEL 3C2*	SK 08 – 003 MI-003	SLM 1432
2	*Daisy IVEL 304*	TCM 221/09 - 4660	ČMI 1383
3	*ADX10-AD-U2H-V2X-G1-OK1*	TCM 221/10 - 4781	
4	*Daisy IVEL 3CFA, Daisy IVEL 3CFB*	TCM 221/13 - 5061	
5	*ADX11A-AD-U2H-V2X-G1-OK1* *ADX11B-AD-U2H-V2X-G1-OK1*	TCM 221/13 - 5062	
6	*ADX12A-AD-U2H-V2C-G1-OK1*	TCM 221/16 - 5350	
7	*Daisy IVEL 3CFC*	TCM 221/16 - 5351	

2. Tvar a rozmery zabezpečovacích značiek
Forms and dimensions of sealing marks



Priemer razidla ∅ 9,9 mm
Diameter of stamp

3. Zodpovedné osoby
Responsible persons

• za zhodu meradla s MID *for the conformity of the measuring instrument with the Directive (MID)*	Ms. Ivan Novakov špec.techn. kontroly / *Specialist Technical Control*
• za overovanie - **prevádzka Teteven** *verification officers – premises Teteven*	Nayden Najdenov, Elena Ivanova
• za overovanie - **prevádzka Gabrovo** *verification officers – premises Gabrovo*	Donka Draschkova, Pavlina Doncheva, Iliyan Georgiev, Peter Zdravkov, Diana Christova

4. Poznámky
Remarks

Tento certifikát o schválení systému kvality výrobného procesu je platný pod podmienkou, že system kvality výrobného procesu je primerane udržiavaný.
This Certificate on approval of the production process quality system remains valid under the condition that the quality system of production process is maintained satisfactory.

Výsledky vyhodnotenia sú uvedené v Záverečnom protokole č. 2016/D024 vydanom dňa 14.12.2016.
Results of evaluation are presented in the Final Protocol No 2016/D024 issued on 14.12.2016.

Posúdenie a preverenie systému kvality výrobného procesu bolo vykonané podľa Prílohy č. 2, Modul D nariadenia vlády Slovenskej republiky č. 145/2016 Z. z. o sprístupňovaní meradiel na trhu, ktorým sa transponuje smernica Európskeho parlamentu a Rady 2014/32/EU z 26. februára 2014 o harmonizácii právnych predpisov členských štátov týkajúcich sa sprístupnenia meradiel na trhu v platnom znení do právneho poriadku Slovenskej republiky (MID), WELMEC 8.6, EN ISO 9001:2008 a postupom podľa EN ISO 19011: 2011 na základe predloženej dokumentácie a auditu na mieste. Schválený systém kvality výrobného procesu podlieha stálemu dohľadu podľa Prílohy č. 2, Modul D, bod 4.1 až 4.4 k nariadeniu vlády v intervaloch minimálne 1 – krát ročne.
The assessment and examination of the production process quality system was carried out according to Annex II, Module D to Government Ordinance of the Slovak Republic No. 145/2016 Coll. relating to the making available on the market of measuring instruments, which implements, in Slovakia, the Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments as later amended, WELMEC 8.6: 2007, EN ISO 9001: 2008 and based on the evaluation of the submitted documents and on the audit on site following EN ISO 19011: 2011. The approved quality system of the production process is subject to permanent surveillance according to Annex II, Module D, articles 4.1 to 4.4 of the Government Ordinance once per year at least.

Výrobca je oprávnený umiestňovať na meradlá vyrobené v rámci tohto Certifikátu o schválení systému kvality výrobného procesu metrologické označenie a identifikačný kód notifikovanej osoby SLM – 1432. Identifikačné číslo notifikovanej osoby musí byť nezmazateľné alebo samo-deštruktívne po odstránení.
The manufacturer is entitled to provide the metrology marking for the measuring instruments produced within the scope of this Certificate on approval of the production process quality system with the SLM identification notified body number 1432. The identification number of the notified body shall be indelible or self-destructive upon removal.

Výrobca je povinný informovať notifikovanú osobu, ktorá schválila systém kvality výrobného procesu o akejkoľvek významnej zamýšľanej zmene systému kvality výrobného procesu.
The manufacturer is obliged to keep the notified body that has approved the production process quality system informed of any significant intended change of the production process quality system.

SLOVAK LEGAL METROLOGY • SLM • 1432

5. História Certifikátu o schválení systému kvality výrobného procesu SK 09 – 013 D
History of the Certificate on approval of the production process quality system

Rev.	Add.	Date of issue	Subject of amendment / extension	Lines
0	0	2009-08-20	Prvé vydanie *First issue*	1
1	0	2012-08-17	Recertifikácia – pridané riadky 2 a 3 *Recertification – Add lines 2 and 3*	3
2	0	2014-06-12	Pridané riadky 4 a 5 *Add lines 4 and 5*	5
3	0	2015-08-14	Recertifikácia *Recertification*	5
4	0	2016-01-05	Pridané riadky 6 a 7 *Add. Lines 6 and 7*	7
5	0	2016-07-26	New MID directive	-

SLOVAK LEGAL METROLOGY
SLM
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Český metrologický institut
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Zkušební laboratoř č. 1341 akreditovaná Českým institutem pro akreditaci, o.p.s podle ČSN EN ISO/IEC 17025:2005

Testing laboratory No. 1341 accredited by the Czech Accreditation Institute according to ISO/IEC 17025:2005

Pracoviště: Oblastní inspektorát Brno / *Regional Inspectorate Brno*, Okružní 31, 638 00 Brno
Laboratory: Odd. primární etalonáže ss a nf elektrických veličin / *Dept. of Primary Metrology of DC and LF Electrical Quantities*

PROTOKOL O ZKOUŠCE
TEST REPORT

Výtisk č. 1 ze 2 *(Copy No. 1 of 2)*

6011-PT-TS001-16

Datum vystavení: 4. ledna 2016
Date of issue: *January 4, 2016*

Zákazník: Daisy Technology Ltd.
Customer: 15-17, Tintiava str.
1113, Izgrev, Sofia
Bulgaria

Měřidlo: Jednofázový statický elektroměr
Measuring instrument: *Single-phase static electricity meter*

Výrobce: DAISY
Manufacturer:

Typ: Daisy IVEL 3CFC
Type:

Výrobní číslo: Identifikace zkoušených elektroměrů je uvedena v příslušných popisech zkoušek
Serial number: *Identification of tested meters is mentioned in corresponding test descriptions*

Výsledky zkoušek byly získány za podmínek a s použitím postupů uvedených v tomto protokolu o zkoušce a vztahují se pouze k době a místu provedení zkoušky.

The results of the tests have been obtained following the procedures reported in this Report and are related only to the date, place and conditions of the test.

Datum provedení zkoušky: 15. října 2015 až 4. ledna 2016
Date of test: *October 15, 2015 – January 4, 2016*

Zkoušku provedl:
Tested by:

Karel Šefčík

Český metrologický institut
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Vedoucí oddělení:
Head of the Department:

Jiří Streit

Specifikace zkoušených vzorků:
Specs of tested samples:

Statický elektroměr pro přímé zapojení do distribuční sítě.
(Static meter for direct connection to the distribution grid.)

- 230 V; 50 Hz; 0,25-5(40)A; I_{st}=15 mA; k=10 000 imp/kWh; Cl. A;
- Komunikace (*communication*): optická hlavice *(opto-head)*; výstup *(output)* S0;
- Stanovený pracovní rozsah *(specified operating range)*: -40 °C...+70 °C;
- 2 tarify s externím přepínáním *(2 tariffs with external control)*;
- Verze *(version)* hardware: 1.00
- Verze *(version)* software: 01,151031; CRC: CEC7

Použité etalony (zařízení):
Measurement standards used (equipment):

Přenosná stanice na zkoušení elektroměrů Landis+Gyr PTS3.3C, v.č. 53113. Kalibrační list z ČMI Brno č.6011-KL-E051-14. Zařízení použité pro zkoušky v institucích mimo ČMI OI Brno je uvedeno v přílohách.
Použité etalony mají metrologickou návaznost na (mezi)národní etalony.
Portable test bench for testing of electricity meters Landis+Gyr PTS3.3C, s.n. 53113. Calibration Certificate from ČMI No. 6011-KL- E051-14. Equipment used for testing in institutions out of CMI, Regional Inspectorate Brno is stated in Attachments.
Standards used are traceable to (inter)national standards.

Zkušební postup:
Test procedure:

Zkoušky byly provedeny podle norem EN 50470-1:2006, EN 50470-3:2006 a dokumentu WELMEC Guide 7.2. Některé zkoušky byly provedeny mimo ČMI. Tato skutečnost je v příslušných odstavcích uvedena, včetně identifikace zkušebního zařízení. Podrobnosti o zkušebním postupu jsou uvedeny v dokumentu ČMI č. 050-MP-C304 a č. 611-MP-C150.

Tests were performed against standards EN 50470-1:2006, 50470-3:2006 and doc. WELMEC Guide 7.2. Some tests were performed out of CMI. This reality is mentioned in given sections, including identification of test equipment. Details of test procedure are described in document ČMI No. 050-MP-C304 and No. 611-MP-C150.

Podmínky prostředí:
Ambient conditions:

Průměrné podmínky okolního prostředí během měření byly:

- Teplota vzduchu: (23,0 ± 2,0) °C
- Relativní vlhkost: (50 ± 15) %

The average ambient conditions during the measurement were as follows:

- *Air temperature: (23,0 ± 2,0) °C*
- *Relative humidity: (50 ± 15) %*

Nejistota měření:
Measurement uncertainty:

Nejistota měření chyb elektroměrů byla 0,15 % při cosφ = 1 a 0,20 % při cosφ ≠ 1.
Measurement uncertainty of meter errors was 0,15 % at cosφ = 1 and 0,20 % at cosφ ≠ 1.

Standardní nejistota měření byla určena v souladu s dokumentem EA–4/02. Uvedená rozšířená nejistota měření je součinem standardní nejistoty měření a koeficientu *k*, který odpovídá pravděpodobnosti pokrytí přibližně 95 %, což pro normální rozdělení odpovídá koeficientu rozšíření $k = 2$.

The standard uncertainty of measurement has been determined in accordance with EA–4/02 document. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k corresponding to a coverage probability of approximately 95 %, which for normal distribution corresponds to a coverage factor k = 2.

Výsledky zkoušek:
Results of testing:

Výsledky zkoušek jsou uvedeny v přílohách:
The results are given in attachments:

Příloha 1 – Přehled výsledků. ČMI Brno
Attachment 1 – Overview of Test Results. ČMI Brno;

Příloha 2 – Zkouška impulzním napětím. Elektrotechnický zkušební ústav Praha: Protokol o zkoušce č. 505068-01/01
Attachment 2 – Impulse Voltage Test. Electrotechnical Testing Institute Prague: Test Reports No. 505068-01/01;

Příloha 3 – Mechanické a klimatické zkoušky. Elektrotechnický zkušební ústav Praha: Protokol o zkoušce č. 505062-01/02
Attachment 3 – Mechanical and climatic tests. Electrotechnical Testing Institute, Praha: Test Report No. 505062-01/02

Příloha 4 – Zkoušky elektromagnetické kompatibility. Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia: Protokol o zkoušce č. 936/12.10.2015 + 936A/12.10.2015 + Application I.
Attachment 4 – EMC Tests. Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia: Test Report No. 936/12.10.2015 + 936A/12.10.2015 + Application I

Příloha 5 – Zkoušky elektromagnetické kompatibility. ČMI Testcom Praha: Protokol o zkoušce č. 8551-PT-E268-15.
Attachment 5 – EMC Tests. ČMI Testcom Praha: Test Report No. 8551-PT-E268-15

Příloha 6 – Validace softwaru. ČMI Testcom Praha: Protokol o zkoušce č. 8552-PT-S0032-15
Attachment 6–Validation of Software. ČMI Testcom Praha:Test Report No. 8552-PT-S0032-15.

Příloha 7 – Předpověď spolehlivosti. Daisy Technology Ltd.: QA Test Report z 12.11.2015
Attachment 7–Reliability prediction. Daisy technology Ltd.: QA Test report dated November 12, 2015.

Vyjádření o plnění specifikace:
Statement of compliance:

Elektroměry Daisy IVEL 3CFC splňují všechny zkoušené požadavky norem EN 50470-1:2006, EN 50470-3:2006 a dokumentu WELMEC 7.2, issue 5 pro třídu A.
Electrical energy meters Daisy IVEL 3CFC have met all tested requirements of standards EN 50470-1:2006, EN 50470-3:2006 and doc. WELMEC 7.2, issue 5 for Class A.

Konec protokolu o zkoušce.
End of test report.

Český metrologický institut -60-

Přehled výsledků zkoušek

Overview of Test Results

Český metrologický institut, Oblastní inspektorát Brno: 16 listů

Czech Metrology Institute, Regional Inspectorate Brno: 16 pages

Položka *Item*	Seznam zkoušek *List of tests*	Všeobecně *General*	Statické elektroměry *Static meters*	
		EN 50470-1 Článek *Clause*	EN 50470-3 Článek *Clause*	Vyhovuje? *Passed?*
1	**Zkoušky vlastností izolace** ***Tests of insulation properties***			
1.1	Zkoušky impulzním napětím *Impulse voltage tests*	7.3.3.1-7.3.33	-	√
1.2	Zkoušky střídavým napětím *AC voltage tests*	-	7.2	√
2	**Zkoušky požadavků na přesnost** ***Tests of accuracy requirements***			
2.1	Přesnost při referenčních podmínkách *Test of accuracy at reference conditions*	-	8.7.2	√
2.3	Zkouška konstanty *Test of meter constant*	-	8.7.10	√
2.4	Počáteční spuštění elektroměru *Test of initial start-up*	-	8.7.9.2	√
2.5	Zkouška náběhu *Test of starting*	-	8.7.9.4	√
2.6	Zkouška chodu naprázdno *Test of no-load condition*	-	8.7.9.3	√
2.7	Zkouška vlivu ovlivňujících veličin *Test of effect of influence quantities*	-	8.7.5	√
	Změny teploty *Temperature variation*		8.7.5.2	√
	Změny napětí *Voltage variation*		8.7.5.3	√
	Změna kmitočtu *Frequency variation*		8.7.5.4	√
	Výpočet složené chyby *Calculation of composite error*		8.7.6	√
3	**Zkoušky vlivu dlouhodobých rušení** ***Tests of effect of disturbances of long duration***			
3.1	Mimořádná změna napětí *Severe voltage variation*	-	8.7.7.2	√
3.2	Obrácený sled fází *Reversed phase sequence*	-	8.7.7.3	Neaplikuje se *Not applicable*
3.3	Nesymetrie napětí *Voltage unbalance*	-	8.7.7.4	Neaplikuje se *Not applicable*
3.4	Krátkodobé nadproudy *Short time over-currents*	-	8.7.8	√
3.5	Vlastní ohřev *Self-heating*	-	8.7.7.5	√
3.7	Přesnost za přítomnosti harmonických *Accuracy in the presence of harmonics*	-	8.7.7.7	√
3.8	Liché harmonické a sub-harmonické *Odd harmonics and sub-harmonics*	-	8.7.7.9	√
3.9	Stejnosměrný proud a sudé harmonické *DC and even harmonics*	-	8.7.7.8	√

3.10	Činnost přídavných zařízení *Operation of auxiliary devices*	-	8.7.7.13	√
4	**Zkoušky elektrických požadavků** ***Tests of electrical requirements***			
4.1	Vlastní spotřeba *Power consumption*	-	7.1	√
4.2	Oteplení *Heating*	7.2	-	√
5	**Zkoušky elektromag. kompatibility (EMC)** ***Tests for electromagnetic compatibility (EMC)***			
5.1	Odolnost proti poklesům a přerušením napětí *Immunity to voltage dips and short interruptions*	7.4.4	-	√
5.2	Potlačení radiového rušení *Radio interference suppresston*	7.4.13	-	√
5.3	Odolnost proti rychlým přechodovým jevům / skupinám impulzů *Immunity to electrical fast transients/bursts*	7.4.7	8.7.7.14	√
5.4	Odolnost proti tlumeným oscilačním vlnám *Immunity to oscillatory waves*	7.4.10	8.7.7.16	Neaplikuje se *Not applicable*
5.5	Odolnost proti vyzařovaným vf elmg polím *Immunity to radiated RF electromagnetic fields*	7.4.6	8.7.7.12	√
5.6	Odolnost proti rušením po vedení indukovaným vf poli *Immunity to conducted disturbances, induced by RF fields*	7.4.8	8.7.7.15	√
5.7	Odolnost proti elektrostatickým výbojům *Immunity to electrostatic discharges*	7.4.5	-	√
5.8	Odolnost proti rázovým impulzům *Immunity to surges*	7.4.9	-	√
5.9	Odolnost proti střídavým magnetickým polím 50 Hz vnějšího původu *Immunity to power frequency magnetic fields of external origin*	7.4.12	8.7.7.11	√
5.10	Odolnost proti stejnosměrným magnetickým polím vnějšího původu *Immunity to continuous magnetic induction of external origin*	7.4.11	8.7.7.10	√
6	**Zkoušky vlivu klimatického prostředí** ***Tests of the effect of the climatic environments***			
6.1	Zkouška suchým teplem (zkouška B) *Dry heat test (Test B)*	6.3.2	-	√
6.2	Zkouška chladem (Zkouška A) *Cold test (Test A)*	6.3.3	-	√
6.3	Cyklická zkouška vlhkým teplem (ZkouškaDb) *Damp heat cyclic test (Test Db)*	6.3.4	-	√
6.4	Zkouška ochrany proti slunci (Zkouška Sa) *Solar radiation test (Test Sa)*	6.3.5	-	√
6.5	Podmínky skladování (2K4) *Storage Conditions (2K4)*	6.1		√
7	**Mechanické zkoušky** ***Mechanical tests***			

7.1	Vibrační zkouška (Zkouška Fc) *Vibration test (Test Fc)*	5.2.2.3	-	√
7.2	Zkouška rázem (Zkouška Ea) *Shock test (Test Ea)*	5.2.2.2	-	√
7.3	Zkouška pružinovým kladívkem (Zkouška Eh) *Spring hammer test (Test Eh)*	5.2.2.1	-	√
7.4	Ochrana proti prachu a vodě *Protection against penetration of dust and water*	5.9	-	√
7.5	Odolnost proti teplu a ohni *Resistance to heat and fire*	5.8	-	√
8	**Další požadavky** ***Other requirements***			
8.1	Normalizované elektrické hodnoty *Standard electrical values*	4.1-4.3	-	√
8.2	Svorkovnice a kryt svorkovnice *Terminal block and terminal cover*	5.4, 5.5	-	√
8.3	Zobrazení naměřených hodnot *Display of measured values*	5.10	-	√
8.4	Zkušební výstup *Test output*	5.11	-	√
8.5	Požadavky na software a na ochranu před zneužitím *Requirements concerning the software and protection against corruption*	-	11	√

√ = vyhovuje
√ = *passed*

EN 50470-1, 7.3.3: Impulse voltage tests

Meters Daisy IVEL 3CFC were tested in Electrotechnical Testing Institute, Praha. Voltage 6 kV, impulse waveform 1,2/50 µs was used.

During the test no flashover, or breakdown was observed.

This test was repeated after the damp heat cyclic test, but with voltage 4,8 kV only. The identical result was detected.

This test was repeated again with votage 8 kV on the request of manufacturer. No change of registers was detected.

Details of test – see Attachment 2 and Attachment 3.

Passed

EN 50470-3, 7.2: AC voltage tests (tested in ČMI)

Meter Daisy IVEL 3CFC, s.n. 1591000001 in non-operating condition was tested. The AC voltage (rms value 4 kV, 50 Hz in the period of 1 min) was applied between voltage and current terminals connected together on the one hand and aluminium conductive foil wrapped around the meter + terminals of all auxiliary circuits connected together on the other hand. The AC voltage (rms value 2 kV, 50 Hz in the period of 1 min) was applied between auxiliary terminals and voltage and current terminals connected together.

No flashover, disruptive discharge or puncture was observed.

Passed

EN 50470-3, 8.7.2 & 8.1: Accuracy test at reference conditions (tested in ČMI)
(Error due to variation of the current at 230 V, 50 Hz)

Intrinsic Error (%) - meter Daisy IVEL 3CFC, s.n. 1591000002 ENERGY IMPORT					
Current	$\cos\varphi = 1$		$\cos\varphi \neq 1$		
	at $\cos\varphi=1$	Limit of intr. error (Cl. A)	at $\cos\varphi=0,5i$	at $\cos\varphi=0,8c$	Limit of intr. error (Cl. A)
I_{min}	-0,09	±2,5	-	-	-
I_{tr}	0,03	±2,0	-0,19	0,07	±2,0
I_{ref}	-0,05	±2,0	-0,24	0,05	±2,0
50 %·I_{max}	-0,09	±2,0	-0,31	0,02	±2,0
I_{max}	-0,07	±2,0	-0,32	0,06	±2,0

Intrinsic Error (%) - meter Daisy IVEL 3CFC, s.n. 1591000002 ENERGY EXPORT					
Current	$\cos\varphi = 1$		$\cos\varphi \neq 1$		
	at $\cos\varphi=1$	Limit of intr. error (Cl. A)	at $\cos\varphi=0,5i$	at $\cos\varphi=0,8c$	Limit of intr. error (Cl. A)
I_{min}	-0,03	±2,5	-	-	-
I_{tr}	-0,08	±2,0	-0,25	0,01	±2,0
I_{ref}	-0,09	±2,0	-0,29	-0,02	±2,0
50 %·I_{max}	-0,06	±2,0	-0,27	0,04	±2,0
I_{max}	-0,01	±2,0	-0,22	0,10	±2,0

Intrinsic Error (%) - meter Daisy IVEL 3CFC, s.n. 1591000003 ENERGY IMPORT					
Current	cosφ = 1		cosφ ≠ 1		
	at cosφ=1	Limit of intr. error (Cl. A)	at cosφ=0,5i	at cosφ=0,8c	Limit of intr. error (Cl. A)
I_{min}	0,00	±2,5	-	-	-
I_{tr}	-0,18	±2,0	-0,12	-0,36	±2,0
I_{ref}	-0,08	±2,0	-0,09	-0,31	±2,0
50 %·I_{max}	-0,01	±2,0	-0,07	-0,29	±2,0
I_{max}	0,03	±2,0	-0,01	-0,28	±2,0

Intrinsic Error (%) - meter Daisy IVEL 3CFC, s.n. 1591000004 ENERGY IMPORT					
Current	cosφ = 1		cosφ ≠ 1		
	at cosφ=1	Limit of intr. error (Cl. A)	at cosφ=0,5i	at cosφ=0,8c	Limit of intr. error (Cl. A)
I_{min}	0,00	±2,5	-	-	-
I_{tr}	-0,16	±2,0	-0,15	-0,28	±2,0
I_{ref}	-0,09	±2,0	-0,11	-0,35	±2,0
50 %·I_{max}	-0,05	±2,0	-0,11	-0,34	±2,0
I_{max}	0,00	±2,0	-0,02	-0,28	±2,0

Intrinsic Error (%) - meter Daisy IVEL 3CFC, s.n. 1591000004 ENERGY EXPORT					
Current	cosφ = 1		cosφ ≠ 1		
	at cosφ=1	Limit of intr. error (Cl. A)	at cosφ=0,5i	at cosφ=0,8c	Limit of intr. error (Cl. A)
I_{min}	0,00	±2,5	-	-	-
I_{tr}	-0,10	±2,0	-0,16	-0,39	±2,0
I_{ref}	-0,09	±2,0	-0,11	-0,40	±2,0
50 %·I_{max}	-0,01	±2,0	-0,15	-0,34	±2,0
I_{max}	-0,08	±2,0	-0,02	-0,23	±2,0

Passed

EN 50470-3, 8.7.10: Test of meter constant (tested in ČMI)

Test of meter constant was realized on test bench, which is able to count LED impulses of tested meter and compare them directly with energy measured by this meter. Measurement was performed in reference conditions, voltage 230 V, max. current and cosφ = 1 on meter Daisy IVEL 3CFC, s.n. 159000003. Difference between energy shown on LCD and energy calculated from number of emitted impulses by test LED (constant is equal to 10 000 imp/kWh) was max. 0,09 %.

Max. allowed value of difference for active energy is $1/10^{th}$ of MPE (= 0,20 %).

Passed

EN 50470-3, 8.7.9.2: Test of start-up (tested in ČMI)

All tested meters were functional within 5 s after the reference voltage was applied to the terminals.

Passed

EN 50470-3, 8.7.9.4: Test of starting (tested in ČMI)

Registration of electrical energy was checked in reference conditions at current I_{st} = 15 mA, reference voltage and cosφ = 1. Meters Daisy IVEL 3CFC, s.n. 159000002 and s.n. 159000003 started and continued to register energy at this current. Test was repeated with energy direction "export" with same result.

Passed

Český metrologický institut
Oblastní inspektorát Brno
Okružní 31
638 00 Brno

EN 50470-3, 8.7.9.3: Test of no-load condition (tested in ČMI)

Meter Daisy IVEL 3CFC, s.n. 159000002 was connected to voltage U_{test} = 115 % of reference voltage with no current flowing in the current circuits (opened circuit). Test period was calculated according formula:

$$\Delta t \geq \frac{240000}{k \cdot m \cdot U_{test} \cdot I_{st}} \text{ (minutes)}$$

The test period Δt has to be longer than 6 min.

It was not detected any pulse from test output during 60 min.

Passed

EN 50470-3, 8.7.5: Test of effect of influence quantities (tested in ČMI)

EN 50470-3, 8.7.5.2 Temperature variation:

The effect of temperature variation was tested in temperature range -40 °C...+70 °C. Additional percentage errors due to temperature variation were determined as a difference of error at stated temperature and error at temperature 23 °C.

Additional error (%) due to temperature variation, meter Daisy IVEL 3CFC, s.n. 159000002									
Current	cosφ	-40°C	-25 °C	-10 °C	+5 °C	+30 °C	+40 °C	+55 °C	+70 °C
I_{min}	1	-2,11	-1,72	-0,98	-0,51	0,26	0,55	0,88	1,15
I_{tr}	1	-2,18	-1,53	-0,93	-0,42	0,34	0,62	0,96	1,23
	0,5ind.	-2,33	-1,61	-1,03	-0,58	0,24	0,43	0,76	1,01
	0,8cap.	-2,11	-1,51	-0,91	-0,35	0,39	0,64	1,01	1,29
I_{ref}	1	-2,11	-1,48	-0,92	-0,39	0,37	0,65	1,00	1,28
	0,5ind.	-2,23	-1,68	-1,06	-0,55	0,22	0,49	0,84	1,12
	0,8cap.	-2,06	-1,48	-0,86	-0,34	0,43	0,70	1,06	1,35
I_{max}	1	-1,87	-1,38	-0,77	-0,24	0,46	0,69	1,06	1,33
	0,5ind.	-2,07	-1,58	-0,98	-0,46	0,29	0,54	0,92	1,16
	0,8cap.	-1,84	-1,29	-0,74	-0,17	0,56	0,78	1,17	1,39
Limits of additional error for class A (%)									
for cosφ = 1		±6,3	±4,8	±3,3	±1,8	±1,8	±3,3	±4,8	±6,3
for cosφ ≠ 1		±9,4	±7,2	±4,9	±2,7	±2,7	±4,9	±7,2	±9,4

Passed

EN 50470-3, 8.7.5.3: Voltage variation (tested in ČMI)

Errors of meters were measured at voltage U_n, $1,1 \cdot U_n$ and $0,9 \cdot U_n$, currents and cos φ stated in the table below. The additional percentage error due to voltage variation was determined as a difference of error at stated voltage and error at voltage 230 V. Results are given below in the tables.

Additional error (%) due to voltage variation - meter Daisy IVEL 3CFC, s.n. 1591000002 ENERGY IMPORT						
Current (A)	Voltage (V)	cosφ = 1		cosφ ≠ 1		
		at cosφ =1	Limit of add. error (Cl. A)	at cosφ =0,5l	at cosφ =0,8c	Limit of add. error (Cl. A)
I_{min}	207	-0,07	±1,0	-	-	-
	253	-0,02	±1,0	-	-	-
I_{tr}	207	-0,02	±1,0	-0,02	-0,05	±1,5
	253	-0,02	±1,0	-0,02	-0,06	±1,5
I_{ref}	207	0,00	±1,0	-0,01	0,00	±1,5
	253	-0,01	±1,0	-0,01	-0,01	±1,5
50 %·I_{max}	207	0,00	±1,0	-0,01	-0,02	±1,5
	253	0,00	±1,0	-0,01	-0,01	±1,5
I_{max}	207	-0,01	±1,0	-0,01	0,00	±1,5
	253	0,04	±1,0	0,02	-0,02	±1,5

Additional error (%) due to voltage variation - meter Daisy IVEL 3CFC, s.n. 1591000002 ENERGY EXPORT						
Current (A)	Voltage (V)	cosφ = 1		cosφ ≠ 1		
		at cosφ=1	Limit of add. error (Cl. A)	at cosφ=0,5l	at cosφ=0,8c	Limit of add. error (Cl. A)
I_{min}	207	-0,09	±1,0	-	-	-
	253	0,00	±1,0	-	-	-
I_{tr}	207	0,00	±1,0	0,00	0,01	±1,5
	253	-0,02	±1,0	-0,02	-0,06	±1,5
I_{ref}	207	0,00	±1,0	0,01	0,01	±1,5
	253	-0,02	±1,0	0,01	0,00	±1,5
50 %·I_{max}	207	0,02	±1,0	0,02	0,01	±1,5
	253	-0,01	±1,0	0,00	-0,02	±1,5
I_{max}	207	0,01	±1,0	0,01	0,03	±1,5
	253	0,02	±1,0	0,00	-0,02	±1,5

Additional error (%) due to voltage variation - meter Daisy IVEL 3CFC, s.n. 1591000003 ENERGY IMPORT						
Current (A)	Voltage (V)	cosφ = 1		cosφ ≠ 1		
		at cosφ=1	Limit of add. error (Cl. A)	at cosφ=0,5l	at cosφ=0,8c	Limit of add. error (Cl. A)
I_{min}	207	0,00	±1,0	-	-	-
	253	0,00	±1,0	-	-	-
I_{tr}	207	0,00	±1,0	0,00	-0,07	±1,5
	253	-0,08	±1,0	-0,08	0,01	±1,5
I_{ref}	207	-0,02	±1,0	0,00	0,01	±1,5
	253	0,06	±1,0	-0,02	-0,02	±1,5
50 %·I_{max}	207	0,01	±1,0	-0,02	0,00	±1,5
	253	-0,02	±1,0	-0,02	0,00	±1,5
I_{max}	207	0,00	±1,0	-0,03	0,02	±1,5
	253	-0,03	±1,0	0,00	0,02	±1,5

Additional error (%) due to voltage variation - meter Daisy IVEL 3CFC, s.n. 1591000004 ENERGY IMPORT						
Current (A)	Voltage (V)	cosφ = 1		cosφ ≠ 1		
		at cosφ=1	Limit of add. error (Cl. A)	at cosφ=0,5l	at cosφ=0,8c	Limit of add. error (Cl. A)
I_{min}	207	0,00	±1,0	-	-	-
	253	0,00	±1,0	-	-	-
I_{tr}	207	0,00	±1,0	0,00	0,03	±1,5
	253	-0,05	±1,0	-0,05	0,00	±1,5
I_{ref}	207	0,09	±1,0	-0,01	0,02	±1,5
	253	0,09	±1,0	-0,03	-0,01	±1,5
50 %·I_{max}	207	0,03	±1,0	0,02	0,00	±1,5
	253	0,00	±1,0	-0,01	-0,01	±1,5
I_{max}	207	0,00	±1,0	0,00	-0,04	±1,5
	253	0,01	±1,0	-0,07	-0,01	±1,5

Additional error (%) due to voltage variation - meter Daisy IVEL 3CFC, s.n. 1591000004 ENERGY EXPORT						
Current (A)	Voltage (V)	cosφ = 1		cosφ ≠ 1		
		at cosφ=1	Limit of add. error (Cl. A)	at cosφ=0,5i	at cosφ=0,8c	Limit of add. error (Cl. A)
I_{min}	207	0,00	±1,0	-	-	-
	253	0,00	±1,0	-	-	-
I_{tr}	207	-0,04	±1,0	-0,04	0,08	±1,5
	253	-0,06	±1,0	-0,06	0,11	±1,5
I_{ref}	207	0,14	±1,0	-0,07	0,10	±1,5
	253	0,16	±1,0	-0,01	0,01	±1,5
50 %·I_{max}	207	-0,03	±1,0	0,06	0,04	±1,5
	253	-0,04	±1,0	0,02	0,06	±1,5
I_{max}	207	0,08	±1,0	0,00	-0,07	±1,5
	253	0,13	±1,0	-0,07	-0,02	±1,5

Passed

EN 50470-3, 8.7.5.4 & EN 6253-23, 8.2: Frequency variation (tested in ČMI)

Errors of meters were measured at frequency 50 Hz, 49 Hz and 51 Hz. Differences from error values at reference frequency 50 Hz (additional percentage errors) are given below in the tables.

Additional error (%) due to frequency variation - meter Daisy IVEL 3CFC, s.n. 1591000002 ENERGY IMPORT						
Current (A)	Frequency (Hz)	cosφ = 1		cosφ ≠ 1		
		at cosφ=1	Limit of add. error (Cl. A)	at cosφ=0,5i	at cosφ=0,8c	Limit of add. error (Cl. A)
I_{min}	49	0,15	±0,8	-	-	-
	51	0,15	±0,8	-	-	-
I_{tr}	49	-0,03	±0,8	0,00	0,03	±1,0
	51	0,00	±0,8	-0,03	0,03	±1,0
I_{ref}	49	0,03	±0,8	0,04	0,02	±1,0
	51	-0,02	±0,8	-0,01	-0,03	±1,0
50 %·I_{max}	49	0,03	±0,8	0,04	0,02	±1,0
	51	-0,01	±0,8	-0,02	-0,01	±1,0
I_{max}	49	0,07	±0,8	0,04	0,04	±1,0
	51	0,02	±0,8	-0,01	-0,01	±1,0

Additional error (%) due to frequency variation - meter Daisy IVEL 3CFC, s.n. 1591000002 ENERGY EXPORT						
Current (A)	Frequency (Hz)	cosφ = 1		cosφ ≠ 1		
		at cosφ=1	Limit of add. error (Cl. A)	at cosφ=0,5i	at cosφ=0,8c	Limit of add. error (Cl. A)
I_{min}	49	0,04	±0,8	-	-	-
	51	0,09	±0,8	-	-	-
I_{tr}	49	-0,05	±0,8	0,00	0,07	±1,0
	51	0,06	±0,8	-0,05	-0,03	±1,0
I_{ref}	49	0,02	±0,8	0,02	0,03	±1,0
	51	-0,03	±0,8	-0,03	-0,01	±1,0
50 %·I_{max}	49	0,04	±0,8	0,04	0,02	±1,0
	51	-0,01	±0,8	-0,02	-0,01	±1,0
I_{max}	49	0,03	±0,8	0,04	0,02	±1,0
	51	-0,01	±0,8	-0,01	-0,01	±1,0

Additional error (%) due to frequency variation - meter Daisy IVEL 3CFC, s.n. 1591000003 ENERGY IMPORT						
Current (A)	Frequency (Hz)	cosφ = 1		cosφ ≠ 1		
		at cosφ=1	Limit of add. error (Cl. A)	at cosφ=0,5i	at cosφ=0,8c	Limit of add. error (Cl. A)
I_{min}	49	0,00	±0,8	-	-	-
	51	0,00	±0,8	-	-	-
I_t	49	0,01	±0,8	0,00	0,02	±1,0
	51	-0,03	±0,8	0,01	-0,09	±1,0
I_{ref}	49	0,07	±0,8	0,03	0,03	±1,0
	51	0,00	±0,8	-0,02	-0,01	±1,0
50 %·I_{max}	49	0,03	±0,8	0,04	0,04	±1,0
	51	0,01	±0,8	-0,01	-0,01	±1,0
I_{max}	49	0,01	±0,8	0,05	0,05	±1,0
	51	-0,02	±0,8	0,03	0,01	±1,0

Additional error (%) due to frequency variation - meter Daisy IVEL 3CFC, s.n. 1591000004 ENERGY IMPORT						
Current (A)	Frequency (Hz)	cosφ = 1		cosφ ≠ 1		
		at cosφ=1	Limit of add. error (Cl. A)	at cosφ=0,5i	at cosφ=0,8c	Limit of add. error (Cl. A)
I_{min}	49	0,00	±0,8	-	-	-
	51	0,00	±0,8	-	-	-
I_t	49	-0,05	±0,8	0,00	-0,10	±1,0
	51	-0,01	±0,8	-0,05	-0,12	±1,0
I_{ref}	49	-0,09	±0,8	0,00	0,00	±1,0
	51	-0,05	±0,8	-0,05	-0,03	±1,0
50 %·I_{max}	49	0,04	±0,8	0,02	0,04	±1,0
	51	0,05	±0,8	-0,01	0,00	±1,0
I_{max}	49	0,03	±0,8	0,05	0,04	±1,0
	51	-0,02	±0,8	-0,02	-0,02	±1,0

Additional error (%) due to frequency variation - meter Daisy IVEL 3CFC, s.n. 1591000004 ENERGY EXPORT						
Current (A)	Frequency (Hz)	cosφ = 1		cosφ ≠ 1		
		at cosφ=1	Limit of add. error (Cl. A)	at cosφ=0,5i	at cosφ=0,8c	Limit of add. error (Cl. A)
I_{min}	49	0,00	±0,8	-	-	-
	51	0,00	±0,8	-	-	-
I_t	49	-0,07	±0,8	0,00	0,11	±1,0
	51	-0,03	±0,8	-0,07	0,02	±1,0
I_{ref}	49	-0,04	±0,8	0,00	0,07	±1,0
	51	-0,02	±0,8	-0,08	0,01	±1,0
50 %·I_{max}	49	0,00	±0,8	0,06	0,03	±1,0
	51	0,04	±0,8	-0,01	0,00	±1,0
I_{max}	49	0,11	±0,8	0,05	0,01	±1,0
	51	0,06	±0,8	-0,02	-0,07	±1,0

Passed

EN 50470-3, 8.7.6: Calculation of composite error for active energy (calculated in ČMI)

The composite error is calculated from the following formula:

$$e_c = \sqrt{e^2(I,\cos\varphi) + \delta^2(T,I,\cos\varphi) + \delta^2(U,I,\cos\varphi) + \delta^2(f,I,\cos\varphi)}$$

There are:

$e(I, \cos\varphi)$ - stands for meter intrinsic error for a given current and $\cos\varphi$;

$\delta(T,I, \cos\varphi)$ - stands for additional percentage error due to variation of temperature in rated temperature range for a given current and $\cos\varphi$;

$\delta(U,I, \cos\varphi)$ - stands for additional percentage error due to variation of voltage ±10 % Un for a given current and $\cos\varphi$;

$\delta(f,I, \cos\varphi)$ - stands for additional percentage error due to variation of frequency ±2 % f_{ref} for a given current and $\cos\varphi$.

Max. values of additional errors due to variation of temperature, voltage and frequency and values of errors at reference conditions are stated in the table below. All errors were rounded to higher values.

Calculation of composite error e_c																	
Load		Additional error (%)						Intrinsic error	Composite error (%) e_c in temperature ranges				MPE (%) for class A in temperature ranges			
Current	cosφ	δ(T,I,cosφ)				δ (U,I,cosφ)	δ (f,I,cosφ)	e (I,cosφ)									
		1	2	3	4				1	2	3	4	1	2	3	4
I_{min}	1	2,11	1,72	0,98	0,51	0,20	0,20	0,09	2,13	1,75	1,02	0,66	±3,5	±5,0	±7,0	±9,0
I_{tr}	1	2,18	1,53	0,93	0,42	0,20	0,20	0,16	2,21	1,57	0,99	0,53	±3,5	±4,5	±7,0	±9,0
	0,5ind.	2,33	1,61	1,03	0,58	0,20	0,20	0,25	2,36	1,65	1,10	0,71				
	0,8cap.	2,11	1,51	0,91	0,39	0,20	0,20	0,39	2,16	1,58	1,03	0,70				
I_{ref}	1	2,11	1,48	0,92	0,39	0,20	0,20	0,09	2,13	1,51	0,97	0,46	±3,5	±4,5	±7,0	±9,0
	0,5ind.	2,23	1,68	1,06	0,55	0,20	0,20	0,29	2,27	1,73	1,13	0,71				
	0,8cap.	2,06	1,48	0,86	0,43	0,20	0,20	0,40	2,12	1,56	0,99	0,74				
I_{max}	1	1,87	1,38	0,77	0,46	0,20	0,20	0,07	1,89	1,41	0,82	0,51	±3,5	±4,5	±7,0	±9,0
	0,5ind.	2,07	1,58	0,98	0,46	0,20	0,20	0,32	2,11	1,64	1,07	0,68				
	0,8cap.	1,84	1,29	0,74	0,56	0,20	0,20	0,26	1,88	1,35	0,84	0,71				

Temperature range 4: 5 °C...30 °C
Temperature range 3: -10 °C...5 °C and 30 °C...40 °C
Temperature range 2: -25 °C...-10 °C and 40 °C...55 °C
Temperature range 1: -40 °C...-25 °C and 55 °C...70 °C

Passed

EN 50470-3, 8.7.7.2: Test of severe voltage variation (tested in ČMI)

Error of meter was loaded with reference current and with different voltages from table below was measured. Differences from error values at reference voltage (i. e. additional percentage errors) are stated in the table below. The test is applicable only for measurement of active energy.

Additional error (%) due to severe voltage variation, meter Daisy iVEL 3CFC, s.n. 1591000001		
Load at current I_{ref}	Additional error	Critical change value for class A
1,15·U_n, cosφ = 1	-0,02	±2,1
0,80·U_n, cosφ = 1	0,01	
0,75·U_n, cosφ = 1	Meter does not measure	(+10...-100) %
0,70·U_n, cosφ = 1	Meter does not measure	(+10...-100) %
1,15·U_n, cosφ = 0,5ind.	-0,04	±3,0
0,80·U_n, cosφ = 0,5ind.	-0,02	
0,75·U_n, cosφ = 0,5ind.	-0,02	(+10...-100) %
0,70·U_n, cosφ = 0,5ind	Meter does not measure	(+10...-100) %

Passed

EN 50470-3, 8.7.8: Short time over-currents (tested in ČMI)

Meter Daisy IVEL 3CFC, s.n. 1591000002 was tested by applying a current pulse 1 200 A for a half-time of period at frequency 50 Hz to the current circuit. Current pulse was applied in the laboratory of IVEP Brno on special equipment for short circuit tests. Current measurement part of pulse equipment consisted from the shunt 500 A/2 V, Analog Optoelectronic Measuring System FM 10, No 708 and Data Registration Card PLC 818, No 92065015. This part was calibrated, calibration certificate No. 83-0744/15 dated January 7, 2015.

The error of meter was measured at reference conditions and current 5 A, $\cos\varphi = 1$ before and after an applying over-current. The difference of these errors was in limits of measurement uncertainty (critical change value ±1,5 % for class A).

Passed

EN 50470-3, 8.7.7.5: Self-heating (tested in ČMI)

The influence of self-heating was determined by measuring the error of meters loaded with max. current 40 A, voltage 230 V every 10 min.
Results are given below in the table.

Influence of self-heating, meter Daisy IVEL 3CFC, s.n. 1591000002		
$\cos\varphi = 1$		
Time after start of measurement	Additional error (%)	Critical change value for class A
10 min	0,05	±1,0
20 min	0,12	±1,0
30 min	0,15	±1,0
40 min	0,18	±1,0
50 min	0,18	±1,0
60 min	0,17	±1,0
70 min	0,18	±1,0
$\cos\varphi = 0,5i$		
10 min	0,06	±1,5
20 min	0,08	±1,5
30 min	0,11	±1,5
40 min	0,12	±1,5
50 min	0,13	±1,5
60 min	0,14	±1,5
70 min	0,15	±1,5

Passed

EN 50470-3, 8.7.7.7: Accuracy in the presence of harmonics (tested in ČMI)

Error of meter Daisy IVEL 3CFC, s.n. 1591000002 in the presence of distorted voltage and current with 5-th harmonic component (content of 10 %·Un and 40 % of $0,5 \cdot I_{max}$) was measured with current 20 A. Distorted voltage and current were produced on test bench Landis+Gyr PTS3.3C. Measured error was compared with error without harmonics. The change was -0,05 %, what is in the range of measurement uncertainty. Critical change value ±1,0 % for class A.

Passed

EN 50470-3, 8.7.7.9: Odd harmonics and sub-harmonics in the a.c. curent circuit (tested in ČMI)

Error of meter Daisy IVEL 3CFC, s.n. 1591000002 at reference voltage in presence of distorted current according Figures C.5 and C.7 of EN 50470-3 was measured at current $5 \cdot I_{tr} = 2,5$ A. Distorted current was produced on test bench Landis+Gyr PTS3.3C. Measured errors were compared with error without distorted current. The change of error was -0,30 % for odd harmonics and 0,05 % for sub-harmonics. These values are smaller than the critical change values ±6,0 % for class A.

Passed

EN 50470-3, 8.7.7.8: DC and even harmonics in the a.c. curent circuit (tested in ČMI)

Error of meter Daisy IVEL 3CFC, s.n. 1591000002 in the presence of the half-wave rectified current waveform according Figures C.2 was measured. Rectified current was generated by commercial equipment Applied Precision Bratislava type HWR 1112B, s.n. 5720060101. The test was performed with current $I_{max}/\sqrt{2} = 28{,}3$ A. Measured error was compared with error without distorted current. The change of error was negligible: 0,10 %.

Critical change value ±6,0 % for class A.

Passed

EN 50470-3, 8.7.7.13: Operation of auxiliary devices (tested in ČMI)

It was found that actuation of tariff switch and S0 output of impulses has no effect on registers and on data shown on LCD of meter Daisy IVEL 3CFC, s.n. 1591000002 (critical change value is ±1,0 % for class A).

Passed

EN 50470-3, 7.1: Power consumption (tested in ČMI)

Power consumption in voltage (at 230 V) and current circuit (at 5 A) was measured on meter Daisy IVEL 3CFC, s.n. 1591000002. Power Analyser Yokogawa WT3000, s.n. 91KB23912, Calibration certificate ČMI No.6011-KL-E0071-15 was used.

Results of measurement:

Voltage circuit: Active power 0,405 W and apparent power 3,73 VA. Allowed values: 2 W and 10 VA.

Current circuit: Apparent power 0,017 VA. Allowed value: 4 VA (Allowed active power is not specified).

Passed

EN 50470-1, 7.2: Heating (tested in ČMI)

Meter Daisy IVEL 3CFC, s.n. 1591000003 was placed into the chamber with temperature 40°C and loaded by the voltage $1{,}15 \cdot U_n$ and current I_{max}. The duration of this test was 120 min. The temperature of the case in different points was measured by thermometer DIGI-TEMP, id.no.611-T-02, calibrated in CMI Brno, Calibration Certif. No. 6036-KL-E0056-14. Max. measured change of temperature was +18,9 K (max. permissible value is 25 K). After the test no damage of meter was observed.

Passed

EN 50470-1, 7.4.4: Immunity to voltage dips and short interruptions (tested in ČMI)

Meter Daisy IVEL 3CFC, s.n. 156000002 was tested in Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia. Voltage dips and short interruptions were produced with generator Schaffner PNW2003. Voltage circuits of meter were energized with reference voltage, current circuit was without any current.

The test was arranged as follows:

1) Voltage dip to 50 % of U_n, dip time 1 min, number of dips: 1;
2) Voltage interruption for 1 s, number of interruptions: 3;
3) Voltage interruption for 1 cycle at 50 Hz, number of interruptions: 1.

During the tests no denials have been registered.

Details of test – see Attachment 4.

Passed

EN 50470-1, 7.4.13: Radio interference suppression (radiated RF emissions)

Meter Daisy IVEL 3CFC, s.n. 156000002 was tested in Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia. The standard EN 55022 was taken into account.

The test was carried out with reference voltage, current from 0,1 to $0{,}2 \cdot I_{ref}$ (=0,65 A) and $\cos\varphi = 1$. Emitted electromagnetic field was measured in frequency range (30 – 1000) MHz and in distance 10 m and in frequency range

(1 – 6) GHz in distance 3 m. Conducted emissions were measured on AC mains terminals consequently in L and N on frequency range (0,15 – 80) MHz.

Measured values were in all cases smaller than allowed values.

Details of test – see Attachment 4.

Passed

EN 50470-1, 7.4.7 & EN 50470-3, 8.7.7.14: Immunity to electrical fast transients/bursts

Meter Daisy IVEL 3CFC, s.n. 156000002 was tested in Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia. The standard EN61000-4-4 was taken into account.

It was applied voltage ±4 kV to the voltage and current circuit L, N and L+N.

Critical change value is ±6,0 % for class A. No denials have been observed.

Details of test – see Attachment 4.

Passed

EN 50470-1, 7.4.6 & EN 50470-3, 8.7.7.12: Immunity to radiated RF electromagnetic fields

Meter Daisy IVEL 3CFC, s.n. 156000002 was tested in Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia. The standard EN61000-4-3 was taken into account.
Frequency band was changed from 80 MHz to 1 GHz and from 1 GHz to 2 GHz. HF field was applied successively from all sides of meter. Vertical and horizontal polarization of field was used.

a) Meters were loaded by reference values. The test field strength in the place of meter was 10 V/m. Additional percentage error was max. 0,34 %. Critical change value is ±3,0 % for class A.
b) Meter without any current, only voltage connected. The test field strength in the place of meter was 30 V/m. During the application of this RF field no denials have been observed..

Details of test – see Attachment 4.

Passed

EN 50470-1, 7.4.8 & EN 50470-3, 8.7.7.15: Immunity to conducted disturbances induced by RF fields

Meter Daisy IVEL 3CFC, s.n. 156000002 was tested in Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia. The standard EN61000-4-6 was taken into account.
The voltage level of conducted disturbances was 10 V, frequency in the range 150 kHz – 80 MHz, sinusoidal modulation 80 %, 1 kHz. Meter connected to 230 V, 5 A, $\cos\varphi = 1$. Additional percentage error was max. -0,39 %. Critical change value is ±3,0 % for class A.

Details of test – see Attachment 4.

Passed

EN 50470-1, 7.4.5: Immunity to electrostatic discharges

Meter Daisy IVEL 3CFC, s.n. 156000002 was tested in Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia. The standard EN61000-4-2 was taken into account.

Meter without any current, only voltage connected. It was applied contact discharge ±8 kV and air discharge ±15 kV, 10 applications in every tested point. During the application of electrostatic discharge ±8 kV to the horizontal and vertical coupling planes no denials have been observed. During the application of electrostatic discharge ±15 kV to the LCD and case of meter no denials have been observed.

Details of test – see Attachment 4.

Passed

EN 50470-1, 7.4.9: Immunity to surges

Meter Daisy IVEL 3CFC, s.n. 156000002 was tested in Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia. The standard EN61000-4-5 was taken into account.
Meter without any current, only voltage connected. The test surge voltage ±4 kV. During the application of surge immunity test voltage to the voltage and current circuit no denials have been observed.

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Details of test – see Attachment 4.

Passed

EN 50470-1, 7.4.12 & EN 50470-3, 8.7.7.11: Immunity to power frequency magnetic fields of external origin

Meter Daisy IVEL 3CFC, s.n. 156000002 was tested in ČMI Testcom Praha. The standard EN61000-4-8 was taken into account.

Meter was energised with reference voltage with reference frequency f_{ref}=50 Hz, current 5 A and $\cos\varphi = 1$. AC magnetic field with frequency f_{ref} was produced with the help of a squere coil. The meter was placed into the middle of the coil,

During the measurement of error, the position of meter was changed and also the phase shift between current in the coil and current in the meter was changed. Additional percentage error was max. 0,9 % (critical change value for class A is ±3,0 %).

Details of test – see Attachment 5.

Passed

EN 50470-1, 7.4.11 & EN 50470-3, 8.7.7.10: Immunity to continuous magnetic induction of external origin (tested in ČMI)

Meter Daisy IVEL 3CFC, s.n. 1591000003 was tested. Continuous magnetic induction was obtained by using electromagnet according Attachment E of standard EN 50470-1. Magneto-motive force 1000 amper-turns was applied. Electromagnet was placed to all accessible points of the meter. No change of meter error was found (critical change value for class B is ±2,0).

Passed

EN 50470-1, 6.3.2: Dry heat test (Test B according EN 60068-2-2; tested in ČMI)

Meter Daisy IVEL 3CFC, s.n. 1591000002 was placed in the chamber with temperature was placed in the chamber with temperature +70°C ± 1°C for the period of 72 h, Method Bb (with gradual change of temperature) was used. After the exposition of this condition meter did not show any damage and operated correctly.

Passed

EN 50470-1, 6.3.3: Cold test (Test A according EN 60068-2-1; tested in ČMI)

Meter Daisy IVEL 3CFC, s.n. 1591000002 in non-operating conditions was placed in the chamber with temperature -40°C ± 2 °C for the period of 72 h. Method Ab (with gradual change of temperature) was used. After the exposition of this condition meter did not show any damage and operated correctly.

Passed

EN 50470-1, 6.3.4: Damp heat cyclic test (Test Db according EN 60068-2-30)

Meter Daisy IVEL 3CFC, s.n. 1591000001 was tested in Electrotechnical Testing Institute, Praha.
Meter in non-operating conditions, only voltage 230 V connected, was placed in the conditioning chambre.
Temperature and air humidity in the chamber was changed in the range 25°C...+40 °C and (95...100) %RH in time intervals according standard EN 60068-2-30. Duration of the test was 6 cycles. After the exposition of this condition meter did show no damage. It was functional and passed through impulse voltage test 1,2/50 µs; 4,8 kV (=0,8 * 6 kV)

Details of test –Attachment 3.

Passed

EN 50470-1, 5.2.2.1: Spring hammer test (Test Eh according EN 60068-2-75)

Meter Daisy IVEL 3CFC, s.n. 1591000001 was tested in Electrotechnical Testing Institute, Praha.
Meter in non-operating condition were tested with a spring hammer, type F22,50, No. DKP 4995. Kinetic energy of hammer was 0,2 J. Number of impacts was 3 to cover of the meter, terminal cover and display cover.

During the test, no damage of the covers occurred.

Details of test – see Attachment 3.

Passed

Český metrologický institut
Oblastní inspektorát Brno
Okružní 31
638 00 Brno
-9-

EN 50470-1, 5.2.2.2: Shock test (Test Ea according EN 60068-2-27)

Meter Daisy IVEL 3CFC, s.n. 1591000001 was tested in Electrotechnical Testing Institute, Praha.
Meter in non-operating condition was tested on the vibration test system LDS-V830-335 SPA8-16K with control system PUMA and acceleration sensor PCB Piezotronics 353B33. Parameters of the shock: half-sine pulse, peak acceleration 30 g_n, duration of the pulse 18 ms, number of shocks: 3 in every axis in positive/negative direction,

After the application of shocks the meter was functional.

Details of test – see Attachment 3.

Passed

EN 50470-1, 5.2.2.3: Vibration test (Test Fc according EN 60068-2-6)

Meter Daisy IVEL 3CFC, s.n. 1591000001 was tested in Electrotechnical Testing Institute, Praha.
Meter in non-operating condition was tested on the vibration test system LDS-V830-335 SPA8-16K with control system PUMA and acceleration sensor PCB Piezotronics 353B33. Parameters of vibrations (10-150) Hz, transition frequency 60 Hz, 10 sweep cycles, amplidude 0,075 mm for f <60 Hz, acceleration 9,8 m/s^2 for f ≥60 Hz. After the application of vibrations the meter was functional.

Details of test – see Attachment 3.

Passed

EN 50470-1, 5.9: Protection against penetration of dust and water (EN 60529)

Meter Daisy IVEL 3CFC was tested in Electrotechnical Testing Institute, Praha. It was found that meter meets the requirements for degree of protection IP51.

Details of test – see Attachment 3.

Passed

EN 50470-1, 5.8: Resistance to heat and fire

The material of the case of meter Daisy IVEL 3CFC is same as of Daisy IVEL 3CFX, which was tested previously. It was found that the case of meter is able to withstand the temperature of glow wire:

- 960°C ± 15°C on terminal block
- 650°C ± 10°C on meter case and on terminal cover.

Passed

EN 50470-1, 4.1 – 4.3: Standard electrical values (checked in ČMI)

Values U_n, f_n, I_{st}, I_{min}, I_{tr}, I_{ref}, I_{max} of meter meet the requirements of standard EN 50470-1, 4.1 – 4.3.

Passed

EN 50470-1, 5.4 & 5.5: Terminal block and terminal cover (checked in ČMI)

Terminal block of meter meets requirements of standard.

Passed

EN 50470-1, 5.10: Display of measured values (checked in ČMI)

LCD register for visual reading by the consumer is easily readable under normal condition of use. The legibility of LCD was acceptable also in temperatures +70 °C and -40 °C. The register is able to record and display energy measured 4000 h at max. load. Identification of tariffs is indicated.

Passed

Český metrologický institut
Oblastní inspektorát Brno
Okružní 31
638 00 Brno

EN 50470-1, 5.11: Test output (checked in ČMI)

Optical test output is accessible from the front side. It emits 10 000 imp/kWh. Pulse frequency at maximum load is lower than the limit 2,5 kHz, The distance of the optical pulse output from other optical devices is sufficiently long to avoid any interference.

Passed

EN 50470-3, 9 and 10: Durability and Reliability

The meter Daisy IVEL 3CFC is designed to maintain an adequate stability of its characteristics. It is also designed to operate reliably. The manufacturer supported this statement by the calculation of reliability prediction.

Details - see Attachment 7.

EN 50470-3, 11: Requirements concerning the software and protection against corruption (tested in ČMI Testcom Praha)

Implemented SW version 01,151031; CRC: CEC7.

SW is unambiguously identified. It is shown on display after connecting to the distribution grid or can be read-out from the meter via opto-head. Metrologically relevant parameters are protected after placing the legal metrology seals,

Details of validation - see Attachment 6.

Passed

Zkouška impulzním napětím
Impulse voltage test

Elektrotechnický zkušební ústav Praha: Protokol o zkoušce č. 505068-01/01
(4 listy + Příloha 1 o 7 listech + příloha 2 o 7 listech)

Electrotechnical Testing Institute, Praha: Test Report No. 505068-01/01
***(4 pages* + Annex 1 with 7 pages + Annex 2 with 7 listech)**

ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV, s.p.
Pod Lisem 129
171 02 Praha 8 - Troja

Číslo protokolu: 505068-01/01

Datum vydání: 30. 12. 2015

L 1056

PROTOKOL O ZKOUŠCE

Výrobek:	Jednofázový elektroměr
Typ:	Daisy IVEL 3CFC
Jmenovité hodnoty:	230 V/50 Hz
Výrobní číslo:	1591000004
Výrobce:	DAISY TECHNOLOGY Ltd. 15-17, Tintiava str., Izgrev,1113 Sofia Bulgaria
Výrobní místo:	-
Objednavatel:	Český metrologický institut Okružní 31, 63800 Brno Česká Republika
Počet zkoušených vzorků:	1
Vzorky předloženy dne:	29.12.2015
Místo provedení zkoušek:	EZÚ
Zkoušky prováděny v době od	29.12.2015 **do** 29.12.2015
Jiné údaje:	-
Výrobek zkoušen podle:	ČSN EN 61000-4-5 ed2:07

Zpracoval: Kamil Chalupa

Schválil: Miroslav Vondra
technický vedoucí
zkušební laboratoře

elektrotechnický zkušební ústav
ezú
-7-
zkušební laboratoř

Zkouška napěťovým impulsem
The test voltage pulse
Podle - According to: ČSN EN 61000-4-5

Výrobek - Product: Jednpofázový elektroměr - Single-phase meter
Typ - Type: Daisy IVEL 3CFC
Výrobní číslo - Part number: 1591000004

Provozní podmínky - Operating conditions:
Zkoušené zařízení v chodu - EUT in operation,
AC 230 V/50 Hz
Teplota - Temperature: 23°C Rel. vlhkost - Rel. humidity: 44%

Uspořádání při měření - Measuring arrangement:
Podle - According to: (ČSN) EN 50470-1 čl.-art. 7.3.3
tvar impulzu- pulse shape .....impulz 1,2/50 specifikovaný-specified in ....HD 588.1 S1
– doba náběhu napětí-voltage rise time.....±30%;
– doba doběhu napětí - deceleration time voltage.....±20%;
– impedance zdroje - source impedance.....500 Ω ± 50 Ω;
– zdroj energie - source of energy.....0,5 J ± 0,05 J;
– zkušební napětí - test voltage.....=8 kV;
– tolerance zkušebního napětí -test voltage tolerance.....+0% -10%.

Požadované kritérium - Allowed criterion:

Aplikované zkušební napětí:

Aplikované napětí - Applied voltage	Zkušební úroveň - Testing level	Splněné kritérium - Performance criterion	Poznámka - Remark
Svorky-terminals 1-3 .....+ generator Svorky-terminals 4-6, 13, 20.....- generator	±8 kV	A	-----

Poznámky - Notes:
Uspořádání dle EN 50470 čl. 7.3.3 - Arrangement according to EN 50470 art. 7.3.3

Výsledek - Test result: V průběhu zkoušky nedošlo ke změně hodnot - During the test, there was a change of values.

Vyhovuje - Pass

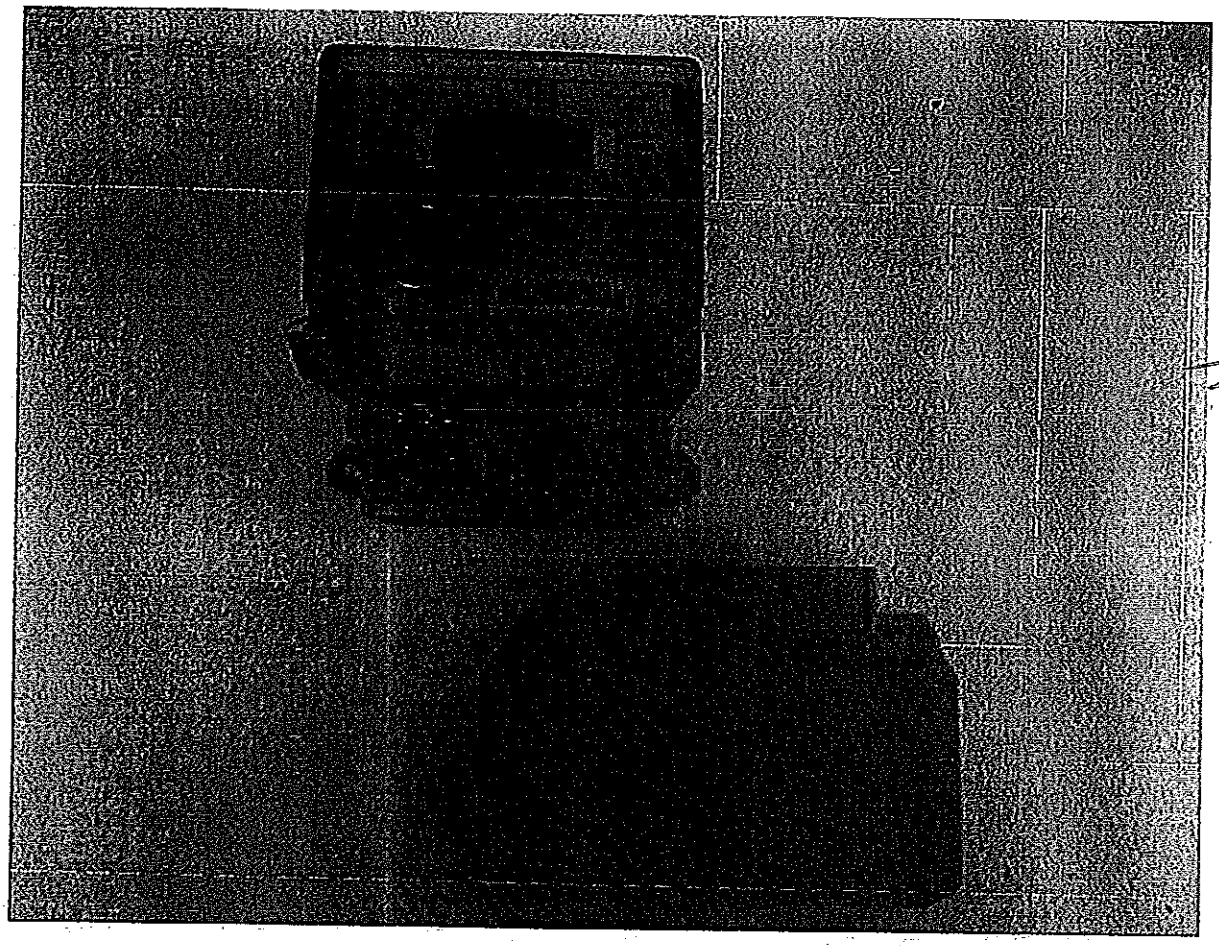
Měřil - Measured by: Vondra Datum - Date: 29.12. 2015 Místo měření - Measured at: EZÚ

Zkušební zařízení - Measuring equipment used:

Description	Type	Evidence No.	Cal. date
☐ Artificial mains RaS	EMCO 3825/2	5852	6.2016
☐ Anténna Frankonia	BTA-M	6321	10.2017
☒ Generator	VCS500N	00110182	8.2017
☒ Coupling/dec. network	CNI 503M	00110181	8.2017
☐ Coupling dec. EM TEST	CDN-M3	---	10.2016
☒ Multimeter Fluke	289	55214-2	01.2017
☐ Anechoic chamber EZU	---	6341	6.2016
Cables:			
☐ K11, K13a, K15	---	---	---
☐ K7a, K9a, K1	---	---	---
☐ K4, K2, K25	---	---	---
☐ K23	---	---	---
☐ K26	---	---	---
☐ K24	---	---	---
EZU equipments:			
☐ Isolated voltage power supply	---	---	---
☒ Rezistor 500 Ω/10 kV	---	---	---
☒ Capacitor 7.8 nF/22 kV	---	---	---
☐ PR29 - Cívka	---	---	---
☐ EN61000-4-8 – Zkušební sestava EZU – EZU test setup	---	---	---

Fotodokumentace - Photodocumentation

Výrobek - Product: Jednpofázový elektroměr- Single-phase meter
Typ - Type: Daisy IVEL 3CFC
Výrobní číslo – Part number: 1591000004



1F_91000004_data_before.txt

```
C.1.0           Serial number
1591000004
0.0.0           Bar code marking
9011101591000004
0.3.0           Meter constant opctical output
10000imp/kWh
0.3.3           Meter constant electrical output
1000imp/kWh
F.F             Error code
0000
1.8.0           Energy A (total)
0000003,078*kWh
1.8.1           Energy A T1
0000000,000*kWh
1.8.2           Energy A T2
0000003,078*kWh
1.8.1-01        Energy A T1 record 1
0000000,000*kWh
1.8.1-02        Energy A T1 record 2
0000000,000*kWh
1.8.1-03        Energy A T1 record 3
0000000,000*kWh
1.8.1-04        Energy A T1 record 4
0000000,000*kWh
1.8.1-05        Energy A T1 record 5
0000000,000*kWh
1.8.1-06        Energy A T1 record 6
0000000,000*kWh
1.8.1-07        Energy A T1 record 7
0000000,000*kWh
1.8.1-08        Energy A T1 record 8
0000000,000*kWh
1.8.1-09        Energy A T1 record 9
0000000,000*kWh
1.8.1-10        Energy A T1 record 10
0000000,000*kWh
1.8.1-11        Energy A T1 record 11
0000000,000*kWh
1.8.1-12        Energy A T1 record 12
0000000,000*kWh
1.8.1-13        Energy A T1 record 13
0000000,000*kWh
1.8.1-14        Energy A T1 record 14
0000000,000*kWh
1.8.1-15        Energy A T1 record 15
0000000,000*kWh
1.8.2-01        Energy A T2 record 1
0000001,620*kWh
1.8.2-02        Energy A T2 record 2
0000000,000*kWh
1.8.2-03        Energy A T2 record 3
0000000,000*kWh
1.8.2-04        Energy A T2 record 4
0000000,000*kWh
1.8.2-05        Energy A T2 record 5
0000000,000*kWh
1.8.2-06        Energy A T2 record 6
0000000,000*kWh
1.8.2-07        Energy A T2 record 7
0000000,000*kWh
1.8.2-08        Energy A T2 record 8
0000000,000*kWh
1.8.2-09        Energy A T2 record 9
0000000,000*kWh
1.8.2-10        Energy A T2 record 10
0000000,000*kWh
1.8.2-11        Energy A T2 record 11
0000000,000*kWh
```

```
1.8.2-12        Energy A T2 record 12
0000000,000*kWh
1.8.2-13        Energy A T2 record 13
0000000,000*kWh
1.8.2-14        Energy A T2 record 14
0000000,000*kWh
1.8.2-15        Energy A T2 record 15
0000001,060*kWh
2.8.0           Energy -A (total)
0000000,011*kWh
2.8.0-01        Energy -A (total) record 1
0000000,010*kWh
2.8.0-02        Energy -A (total) record 2
0000000,000*kWh
2.8.0-03        Energy -A (total) record 3
0000000,000*kWh
2.8.0-04        Energy -A (total) record 4
0000000,000*kWh
2.8.0-05        Energy -A (total) record 5
0000000,000*kWh
2.8.0-06        Energy -A (total) record 6
0000000,000*kWh
2.8.0-07        Energy -A (total) record 7
0000000,000*kWh
2.8.0-08        Energy -A (total) record 8
0000000,000*kWh
2.8.0-09        Energy -A (total) record 9
0000000,000*kWh
2.8.0-10        Energy -A (total) record 10
0000000,000*kWh
2.8.0-11        Energy -A (total) record 11
0000000,000*kWh
2.8.0-12        Energy -A (total) record 12
0000000,000*kWh
2.8.0-13        Energy -A (total) record 13
0000000,000*kWh
2.8.0-14        Energy -A (total) record 14
0000000,000*kWh
2.8.0-15        Energy -A (total) record 15
0000000,000*kWh
1.6.1           Max average power for time interval of 15 min T1
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2           Max average power for time interval of 15 min T2
0001,12*kW,15-12-03  15:41 yy-MM-dd HH:mm
1.6.1-01        Max average power for time interval of 15 min T1 month 1
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-02        Max average power for time interval of 15 min T1 month 2
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-03        Max average power for time interval of 15 min T1 month 3
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-04        Max average power for time interval of 15 min T1 month 4
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-05        Max average power for time interval of 15 min T1 month 5
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-06        Max average power for time interval of 15 min T1 month 6
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-07        Max average power for time interval of 15 min T1 month 7
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-08        Max average power for time interval of 15 min T1 month 8
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-09        Max average power for time interval of 15 min T1 month 9
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-10        Max average power for time interval of 15 min T1 month 10
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-11        Max average power for time interval of 15 min T1 month 11
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-12        Max average power for time interval of 15 min T1 month 12
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
```

1.6.1-13 Max average power for time interval of 15 min T1 month 13
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.1-14 Max average power for time interval of 15 min T1 month 14
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.1-15 Max average power for time interval of 15 min T1 month 15
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-01 Max average power for time interval of 15 min T2 month 1
0014,75*kW,43-06-13 00:52 yy-MM-dd HH:mm
1.6.2-02 Max average power for time interval of 15 min T2 month 2
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-03 Max average power for time interval of 15 min T2 month 3
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-04 Max average power for time interval of 15 min T2 month 4
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-05 Max average power for time interval of 15 min T2 month 5
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-06 Max average power for time interval of 15 min T2 month 6
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-07 Max average power for time interval of 15 min T2 month 7
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-08 Max average power for time interval of 15 min T2 month 8
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-09 Max average power for time interval of 15 min T2 month 9
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-10 Max average power for time interval of 15 min T2 month 10
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-11 Max average power for time interval of 15 min T2 month 11
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-12 Max average power for time interval of 15 min T2 month 12
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-13 Max average power for time interval of 15 min T2 month 13
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-14 Max average power for time interval of 15 min T2 month 14
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
1.6.2-15 Max average power for time interval of 15 min T2 month 15
0014,72*kW,40-10-30 14:02 yy-MM-dd HH:mm
2.6.0 Max average supplied power for time interval of 15 min
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-01 Max average supplied power for time interval of 15 min month 1
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-02 Max average supplied power for time interval of 15 min month 2
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-03 Max average supplied power for time interval of 15 min month 3
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-04 Max average supplied power for time interval of 15 min month 4
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-05 Max average supplied power for time interval of 15 min month 5
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-06 Max average supplied power for time interval of 15 min month 6
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-07 Max average supplied power for time interval of 15 min month 7
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-08 Max average supplied power for time interval of 15 min month 8
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-09 Max average supplied power for time interval of 15 min month 9
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-10 Max average supplied power for time interval of 15 min month 10
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-11 Max average supplied power for time interval of 15 min month 11
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-12 Max average supplied power for time interval of 15 min month 12
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-13 Max average supplied power for time interval of 15 min month 13
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-14 Max average supplied power for time interval of 15 min month 14
0000,00*kW,15-03-01 00:00 yy-MM-dd HH:mm
2.6.0-15 Max average supplied power for time interval of 15 min month 15
0014,72*kW,40-10-30 11:12 yy-MM-dd HH:mm

```
C.8.1           Operating time of T1
000000:00 HHHHHH:mm
C.8.2           Operating time of T2
000000:42 HHHHHH:mm
C.8.0           Total operating time +A
000000:42 HHHHHH:mm
C.82.0          Total operating time -A
000000:00 HHHHHH:mm
C.7.1           Number of voltage dropouts
00000051
C.7.1-01        Number of voltage dropouts month 1
00000009
C.7.1-02        Number of voltage dropouts month 2
00000000
C.7.1-03        Number of voltage dropouts month 3
00000000
C.7.1-04        Number of voltage dropouts month 4
00000000
C.7.1-05        Number of voltage dropouts month 5
00000000
C.7.1-06        Number of voltage dropouts month 6
00000000
C.7.1-07        Number of voltage dropouts month 7
00000000
C.7.1-08        Number of voltage dropouts month 8
00000000
C.7.1-09        Number of voltage dropouts month 9
00000000
C.7.1-10        Number of voltage dropouts month 10
00000000
C.7.1-11        Number of voltage dropouts month 11
00000000
C.7.1-12        Number of voltage dropouts month 12
00000000
C.7.1-13        Number of voltage dropouts month 13
00000000
C.7.1-14        Number of voltage dropouts month 14
00000000
C.7.1-15        Number of voltage dropouts month 15
00000001
0.2.1           Identification of SW version                    verze
00,151031,CEC7
C.2.1           Date and time of the last parameterization
00-01-01 00:02 yy-MM-dd HH:mm
C.2.9           Date and time of last reading                   15-11-18
09:04 yy-MM-dd HH:mm
0.9.2           Date                                            15-12-29
yy-MM-dd
0.9.1           Time                                            13:34:13
HH:mm:ss
C.51.15         Date and time of last RTC synchronization
15-11-17  19:46 yy-MM-dd HH:mm
82.8.1-01       Date and time of removing cover record 1
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-02       Date and time of removing cover record 2
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-03       Date and time of removing cover record 3
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-04       Date and time of removing cover record 4
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-05       Date and time of removing cover record 5
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-06       Date and time of removing cover record 6
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-07       Date and time of removing cover record 7
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-08       Date and time of removing cover record 8
00-00-00  00:00 yy-MM-dd HH:mm
```

```
82.8.1-09       Date and time of removing cover record 9
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-10       Date and time of removing cover record 10
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-11       Date and time of removing cover record 11
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-12       Date and time of removing cover record 12
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-13       Date and time of removing cover record 13
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-14       Date and time of removing cover record 14
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-15       Date and time of removing cover record 15
00-00-00  00:00 yy-MM-dd HH:mm
C.6.0           Battery operating time                          00-00-00
 00:42 yy-MM-dd HH:mm
C.6.3           Battery voltage                                 3.60V

==================================

C.1.0(1591000004)
0.0.0(901110159100004)
0.3.0(10000imp/kwh)
0.3.3(1000imp/kwh)
F.F(0000)
1.8.0(0000003,078*kwh)
1.8.1(0000000,000*kwh)
1.8.2(0000003,078*kwh)
1.8.1-01(0000000,000*kwh)
1.8.1-02(0000000,000*kwh)
1.8.1-03(0000000,000*kwh)
1.8.1-04(0000000,000*kwh)
1.8.1-05(0000000,000*kwh)
1.8.1-06(0000000,000*kwh)
1.8.1-07(0000000,000*kwh)
1.8.1-08(0000000,000*kwh)
1.8.1-09(0000000,000*kwh)
1.8.1-10(0000000,000*kwh)
1.8.1-11(0000000,000*kwh)
1.8.1-12(0000000,000*kwh)
1.8.1-13(0000000,000*kwh)
1.8.1-14(0000000,000*kwh)
1.8.1-15(0000000,000*kwh)
1.8.2-01(0000001,620*kwh)
1.8.2-02(0000000,000*kwh)
1.8.2-03(0000000,000*kwh)
1.8.2-04(0000000,000*kwh)
1.8.2-05(0000000,000*kwh)
1.8.2-06(0000000,000*kwh)
1.8.2-07(0000000,000*kwh)
1.8.2-08(0000000,000*kwh)
1.8.2-09(0000000,000*kwh)
1.8.2-10(0000000,000*kwh)
1.8.2-11(0000000,000*kwh)
1.8.2-12(0000000,000*kwh)
1.8.2-13(0000000,000*kwh)
1.8.2-14(0000000,000*kwh)
1.8.2-15(0000001,060*kwh)
2.8.0(0000000,011*kwh)
2.8.0-01(0000000,010*kwh)
2.8.0-02(0000000,000*kwh)
2.8.0-03(0000000,000*kwh)
2.8.0-04(0000000,000*kwh)
2.8.0-05(0000000,000*kwh)
2.8.0-06(0000000,000*kwh)
2.8.0-07(0000000,000*kwh)
2.8.0-08(0000000,000*kwh)
2.8.0-09(0000000,000*kwh)
```

```
2.8.0-10(0000000,000*kwh)
2.8.0-11(0000000,000*kwh)
2.8.0-12(0000000,000*kwh)
2.8.0-13(0000000,000*kwh)
2.8.0-14(0000000,000*kwh)
2.8.0-15(0000000,000*kwh)
1.6.1(0000,00*kW,1503010000)
1.6.2(0001.12*kW,1512031541)
1.6.1-01(0000,00*kW,1503010000)
1.6.1-02(0000,00*kW,1503010000)
1.6.1-03(0000,00*kW,1503010000)
1.6.1-04(0000,00*kW,1503010000)
1.6.1-05(0000,00*kW,1503010000)
1.6.1-06(0000,00*kW,1503010000)
1.6.1-07(0000,00*kW,1503010000)
1.6.1-08(0000,00*kW,1503010000)
1.6.1-09(0000,00*kW,1503010000)
1.6.1-10(0000,00*kW,1503010000)
1.6.1-11(0000,00*kW,1503010000)
1.6.1-12(0000,00*kW,1503010000)
1.6.1-13(0000,00*kW,1503010000)
1.6.1-14(0000,00*kW,1503010000)
1.6.1-15(0000,00*kW,1503010000)
1.6.2-01(0014,75*kW,4306130052)
1.6.2-02(0000,00*kW,1503010000)
1.6.2-03(0000,00*kW,1503010000)
1.6.2-04(0000,00*kW,1503010000)
1.6.2-05(0000,00*kW,1503010000)
1.6.2-06(0000,00*kW,1503010000)
1.6.2-07(0000,00*kW,1503010000)
1.6.2-08(0000,00*kW,1503010000)
1.6.2-09(0000,00*kW,1503010000)
1.6.2-10(0000,00*kW,1503010000)
1.6.2-11(0000,00*kW,1503010000)
1.6.2-12(0000,00*kW,1503010000)
1.6.2-13(0000,00*kW,1503010000)
1.6.2-14(0000,00*kW,1503010000)
1.6.2-15(0014,72*kW,4010301402)
2.6.0(0000,00*kW,1503010000)
2.6.0-01(0000,00*kW,1503010000)
2.6.0-02(0000,00*kW,1503010000)
2.6.0-03(0000,00*kW,1503010000)
2.6.0-04(0000,00*kW,1503010000)
2.6.0-05(0000,00*kW,1503010000)
2.6.0-06(0000,00*kW,1503010000)
2.6.0-07(0000,00*kW,1503010000)
2.6.0-08(0000,00*kW,1503010000)
2.6.0-09(0000,00*kW,1503010000)
2.6.0-10(0000,00*kW,1503010000)
2.6.0-11(0000,00*kW,1503010000)
2.6.0-12(0000,00*kW,1503010000)
2.6.0-13(0000,00*kW,1503010000)
2.6.0-14(0000,00*kW,1503010000)
2.6.0-15(0014,72*kW,4010301112)
C.8.0(00000042)
C.8.1(00000000)
C.8.2(00000042)
C.82.0(00000000)
C.7.1(00000051)
C.7.1-01(00000009)
C.7.1-02(00000000)
C.7.1-03(00000000)
C.7.1-04(00000000)
C.7.1-05(00000000)
C.7.1-06(00000000)
C.7.1-07(00000000)
C.7.1-08(00000000)
C.7.1-09(00000000)
```

```
C.7.1-10(00000000)
C.7.1-11(00000000)
C.7.1-12(00000000)
C.7.1-13(00000000)
C.7.1-14(00000000)
C.7.1-15(00000001)
0.2.1(verze 00,151031,CEC7)
C.2.1(0001010002)
C.2.9(1511180904)
0.9.2(151229)
0.9.1(133413)
C.51.15(1511171946)
82.8.1-01(0000000000)
82.8.1-02(0000000000)
82.8.1-03(0000000000)
82.8.1-04(0000000000)
82.8.1-05(0000000000)
82.8.1-06(0000000000)
82.8.1-07(0000000000)
82.8.1-08(0000000000)
82.8.1-09(0000000000)
82.8.1-10(0000000000)
82.8.1-11(0000000000)
82.8.1-12(0000000000)
82.8.1-13(0000000000)
82.8.1-14(0000000000)
82.8.1-15(0000000000)
C.6.0(0000000042)
C.6.3(3.60V)
!
```

1F_91000004_Data_after_test.txt

C.1.0 Serial number
1591000004
0.0.0 Bar code marking
9011101591000004
0.3.0 Meter constant opctical output
10000imp/kWh
0.3.3 Meter constant electrical output
1000imp/kWh
F.F Error code
0000
1.8.0 Energy A (total)
0000003,078*kWh
1.8.1 Energy A T1
0000000,000*kWh
1.8.2 Energy A T2
0000003,078*kWh
1.8.1-01 Energy A T1 record 1
0000000,000*kWh
1.8.1-02 Energy A T1 record 2
0000000,000*kWh
1.8.1-03 Energy A T1 record 3
0000000,000*kWh
1.8.1-04 Energy A T1 record 4
0000000,000*kWh
1.8.1-05 Energy A T1 record 5
0000000,000*kWh
1.8.1-06 Energy A T1 record 6
0000000,000*kWh
1.8.1-07 Energy A T1 record 7
0000000,000*kWh
1.8.1-08 Energy A T1 record 8
0000000,000*kWh
1.8.1-09 Energy A T1 record 9
0000000,000*kWh
1.8.1-10 Energy A T1 record 10
0000000,000*kWh
1.8.1-11 Energy A T1 record 11
0000000,000*kWh
1.8.1-12 Energy A T1 record 12
0000000,000*kWh
1.8.1-13 Energy A T1 record 13
0000000,000*kWh
1.8.1-14 Energy A T1 record 14
0000000,000*kWh
1.8.1-15 Energy A T1 record 15
0000000,000*kWh
1.8.2-01 Energy A T2 record 1
0000001,620*kWh
1.8.2-02 Energy A T2 record 2
0000000,000*kWh
1.8.2-03 Energy A T2 record 3
0000000,000*kWh
1.8.2-04 Energy A T2 record 4
0000000,000*kWh
1.8.2-05 Energy A T2 record 5
0000000,000*kWh
1.8.2-06 Energy A T2 record 6
0000000,000*kWh
1.8.2-07 Energy A T2 record 7
0000000,000*kWh
1.8.2-08 Energy A T2 record 8
0000000,000*kWh
1.8.2-09 Energy A T2 record 9
0000000,000*kWh
1.8.2-10 Energy A T2 record 10
0000000,000*kWh
1.8.2-11 Energy A T2 record 11
0000000,000*kWh

```
1.8.2-12        Energy A T2 record 12
0000000,000*kWh
1.8.2-13        Energy A T2 record 13
0000000,000*kWh
1.8.2-14        Energy A T2 record 14
0000000,000*kWh
1.8.2-15        Energy A T2 record 15
0000001,060*kWh
2.8.0           Energy -A (total)
0000000,011*kWh
2.8.0-01        Energy -A (total) record 1
0000000,010*kWh
2.8.0-02        Energy -A (total) record 2
0000000,000*kWh
2.8.0-03        Energy -A (total) record 3
0000000,000*kWh
2.8.0-04        Energy -A (total) record 4
0000000,000*kWh
2.8.0-05        Energy -A (total) record 5
0000000,000*kWh
2.8.0-06        Energy -A (total) record 6
0000000,000*kWh
2.8.0-07        Energy -A (total) record 7
0000000,000*kWh
2.8.0-08        Energy -A (total) record 8
0000000,000*kWh
2.8.0-09        Energy -A (total) record 9
0000000,000*kWh
2.8.0-10        Energy -A (total) record 10
0000000,000*kWh
2.8.0-11        Energy -A (total) record 11
0000000,000*kWh
2.8.0-12        Energy -A (total) record 12
0000000,000*kWh
2.8.0-13        Energy -A (total) record 13
0000000,000*kWh
2.8.0-14        Energy -A (total) record 14
0000000,000*kWh
2.8.0-15        Energy -A (total) record 15
0000000,000*kWh
1.6.1           Max average power for time interval of 15 min T1
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2           Max average power for time interval of 15 min T2
0001,12*kW,15-12-03  15:41 yy-MM-dd HH:mm
1.6.1-01        Max average power for time interval of 15 min T1 month 1
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-02        Max average power for time interval of 15 min T1 month 2
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-03        Max average power for time interval of 15 min T1 month 3
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-04        Max average power for time interval of 15 min T1 month 4
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-05        Max average power for time interval of 15 min T1 month 5
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-06        Max average power for time interval of 15 min T1 month 6
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-07        Max average power for time interval of 15 min T1 month 7
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-08        Max average power for time interval of 15 min T1 month 8
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-09        Max average power for time interval of 15 min T1 month 9
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-10        Max average power for time interval of 15 min T1 month 10
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-11        Max average power for time interval of 15 min T1 month 11
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-12        Max average power for time interval of 15 min T1 month 12
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
```

```
1.6.1-13        Max average power for time interval of 15 min T1 month 13
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-14        Max average power for time interval of 15 min T1 month 14
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.1-15        Max average power for time interval of 15 min T1 month 15
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-01        Max average power for time interval of 15 min T2 month 1
0014,75*kW,43-06-13  00:52 yy-MM-dd HH:mm
1.6.2-02        Max average power for time interval of 15 min T2 month 2
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-03        Max average power for time interval of 15 min T2 month 3
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-04        Max average power for time interval of 15 min T2 month 4
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-05        Max average power for time interval of 15 min T2 month 5
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-06        Max average power for time interval of 15 min T2 month 6
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-07        Max average power for time interval of 15 min T2 month 7
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-08        Max average power for time interval of 15 min T2 month 8
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-09        Max average power for time interval of 15 min T2 month 9
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-10        Max average power for time interval of 15 min T2 month 10
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-11        Max average power for time interval of 15 min T2 month 11
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-12        Max average power for time interval of 15 min T2 month 12
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-13        Max average power for time interval of 15 min T2 month 13
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-14        Max average power for time interval of 15 min T2 month 14
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
1.6.2-15        Max average power for time interval of 15 min T2 month 15
0014,72*kW,40-10-30  14:02 yy-MM-dd HH:mm
2.6.0           Max average supplied power for time interval of 15 min
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-01        Max average supplied power for time interval of 15 min month 1
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-02        Max average supplied power for time interval of 15 min month 2
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-03        Max average supplied power for time interval of 15 min month 3
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-04        Max average supplied power for time interval of 15 min month 4
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-05        Max average supplied power for time interval of 15 min month 5
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-06        Max average supplied power for time interval of 15 min month 6
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-07        Max average supplied power for time interval of 15 min month 7
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-08        Max average supplied power for time interval of 15 min month 8
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-09        Max average supplied power for time interval of 15 min month 9
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-10        Max average supplied power for time interval of 15 min month 10
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-11        Max average supplied power for time interval of 15 min month 11
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-12        Max average supplied power for time interval of 15 min month 12
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-13        Max average supplied power for time interval of 15 min month 13
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-14        Max average supplied power for time interval of 15 min month 14
0000,00*kW,15-03-01  00:00 yy-MM-dd HH:mm
2.6.0-15        Max average supplied power for time interval of 15 min month 15
0014,72*kW,40-10-30  11:12 yy-MM-dd HH:mm
```

```
C.8.1           Operating time of T1
000000:00 HHHHHH:mm
C.8.2           Operating time of T2
000000:42 HHHHHH:mm
C.8.0           Total operating time +A
000000:42 HHHHHH:mm
C.82.0          Total operating time -A
000000:00 HHHHHH:mm
C.7.1           Number of voltage dropouts
00000052
C.7.1-01        Number of voltage dropouts month 1
00000009
C.7.1-02        Number of voltage dropouts month 2
00000000
C.7.1-03        Number of voltage dropouts month 3
00000000
C.7.1-04        Number of voltage dropouts month 4
00000000
C.7.1-05        Number of voltage dropouts month 5
00000000
C.7.1-06        Number of voltage dropouts month 6
00000000
C.7.1-07        Number of voltage dropouts month 7
00000000
C.7.1-08        Number of voltage dropouts month 8
00000000
C.7.1-09        Number of voltage dropouts month 9
00000000
C.7.1-10        Number of voltage dropouts month 10
00000000
C.7.1-11        Number of voltage dropouts month 11
00000000
C.7.1-12        Number of voltage dropouts month 12
00000000
C.7.1-13        Number of voltage dropouts month 13
00000000
C.7.1-14        Number of voltage dropouts month 14
00000000
C.7.1-15        Number of voltage dropouts month 15
00000001
0.2.1           Identification of SW version                    verze
00,151031,CEC7
C.2.1           Date and time of the last parameterization
00-01-01 00:02 yy-MM-dd HH:mm
C.2.9           Date and time of last reading                   15-12-29
13:34 yy-MM-dd HH:mm
0.9.2           Date                                            15-12-29
yy-MM-dd
0.9.1           Time                                            14:11:29
HH:mm:ss
C.51.15         Date and time of last RTC synchronization
15-11-17  19:46 yy-MM-dd HH:mm
82.8.1-01       Date and time of removing cover record 1
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-02       Date and time of removing cover record 2
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-03       Date and time of removing cover record 3
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-04       Date and time of removing cover record 4
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-05       Date and time of removing cover record 5
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-06       Date and time of removing cover record 6
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-07       Date and time of removing cover record 7
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-08       Date and time of removing cover record 8
00-00-00  00:00 yy-MM-dd HH:mm
```

```
82.8.1-09       Date and time of removing cover record 9
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-10       Date and time of removing cover record 10
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-11       Date and time of removing cover record 11
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-12       Date and time of removing cover record 12
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-13       Date and time of removing cover record 13
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-14       Date and time of removing cover record 14
00-00-00  00:00 yy-MM-dd HH:mm
82.8.1-15       Date and time of removing cover record 15
00-00-00  00:00 yy-MM-dd HH:mm
C.6.0           Battery operating time                          00-00-00
 00:42 yy-MM-dd HH:mm
C.6.3           Battery voltage                                 3.60V

==================================

C.1.0(1591000004)
0.0.0(9011101591000004)
0.3.0(10000imp/kwh)
0.3.3(1000imp/kwh)
F.F(0000)
1.8.0(0000003,078*kWh)
1.8.1(0000000,000*kWh)
1.8.2(0000003,078*kWh)
1.8.1-01(0000000,000*kWh)
1.8.1-02(0000000,000*kWh)
1.8.1-03(0000000,000*kWh)
1.8.1-04(0000000,000*kWh)
1.8.1-05(0000000,000*kWh)
1.8.1-06(0000000,000*kWh)
1.8.1-07(0000000,000*kWh)
1.8.1-08(0000000,000*kWh)
1.8.1-09(0000000,000*kWh)
1.8.1-10(0000000,000*kWh)
1.8.1-11(0000000,000*kWh)
1.8.1-12(0000000,000*kWh)
1.8.1-13(0000000,000*kWh)
1.8.1-14(0000000,000*kWh)
1.8.1-15(0000000,000*kWh)
1.8.2-01(0000001,620*kWh)
1.8.2-02(0000000,000*kWh)
1.8.2-03(0000000,000*kWh)
1.8.2-04(0000000,000*kWh)
1.8.2-05(0000000,000*kWh)
1.8.2-06(0000000,000*kWh)
1.8.2-07(0000000,000*kWh)
1.8.2-08(0000000,000*kWh)
1.8.2-09(0000000,000*kWh)
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1.8.2-11(0000000,000*kWh)
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1.8.2-15(0000001,060*kWh)
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2.8.0-05(0000000,000*kWh)
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2.8.0-07(0000000,000*kWh)
2.8.0-08(0000000,000*kWh)
2.8.0-09(0000000,000*kWh)
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2.8.0-10(0000000,000*kWh)
2.8.0-11(0000000,000*kWh)
2.8.0-12(0000000,000*kWh)
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Mechanické a klimatické zkoušky

Mechanical and Climatic Tests

Elektrotechnický zkušební ústav Praha: Protokol o zkoušce č. 505062-01/02 (11 listů)

Electrotechnical Testing Institute Praha: Test Report No. 505062-01/01 (11 pages)

ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV, s.p.
Pod Lisem 129
171 02 Praha 8 - Troja

Číslo protokolu: 505062-01/02

Počet stran: 11
Počet příloh/Počet stran příloh: 0/0

Datum vydání: 31. 12. 2015

PROTOKOL O ZKOUŠCE

Výrobek:	**Jednofázový statický elektroměr**
Typ:	Daisy IVEL 3CFC
Jmenovité hodnoty:	230V; 0,25-5(40) A; třída A; 3K7; 10 000 imp/kWh
Výrobní číslo:	1591000001
Výrobce:	**DAISY TECHNOLOGY Ltd.,** 15-17, Tintiava str., Izgrev, 1113 Sofia, Bulharská republika
Výrobní místo:	DAISY TECHNOLOGY Ltd., 15-17, Tintiava str., Izgrev, 1113 Sofia, Bulharská republika
Objednavatel:	**Český metrologický institut,** Okružní 772/31, 638 00 Brno, Česká republika
Počet zkoušených vzorků:	1
Vzorky předloženy dne:	23. 12. 2015
Místo provedení zkoušek:	EZÚ
Zkoušky prováděny v době od	23. 12. 2015 **do** 30. 12. 2015
Jiné údaje:	-
Zkušební předpis:	ČSN EN 50470-1:2007, čl. 5.2.2.1, 5.2.2.2, 5.2.2.3, 5.9, 6.3.4 a 7.3.3.3, ČSN EN 60068-2-75:1999, ČSN EN 60068-2-27 ed. 2:2010, ČSN EN 60068-2-6 ed. 2:2008, ČSN EN 60529:1993 +A1:2001 +A2:2014 ČSN EN 60068-2-30 ed. 2:2006

Zpracoval: Josef Šašek

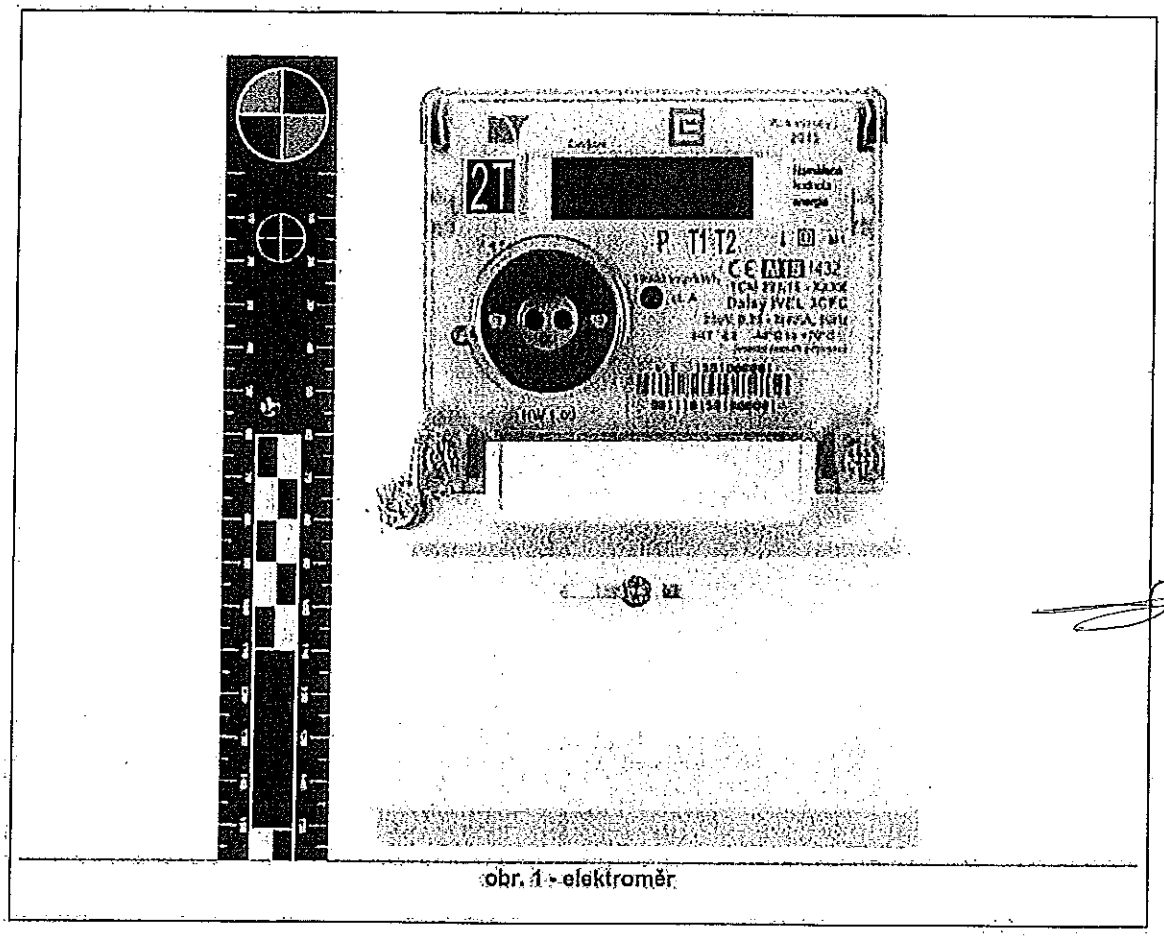
elektrotechnický zkušební ústav ezú -11- zkušební laboratoř

Schválil: Jiří Bažant
technický vedoucí zkušební laboratoře

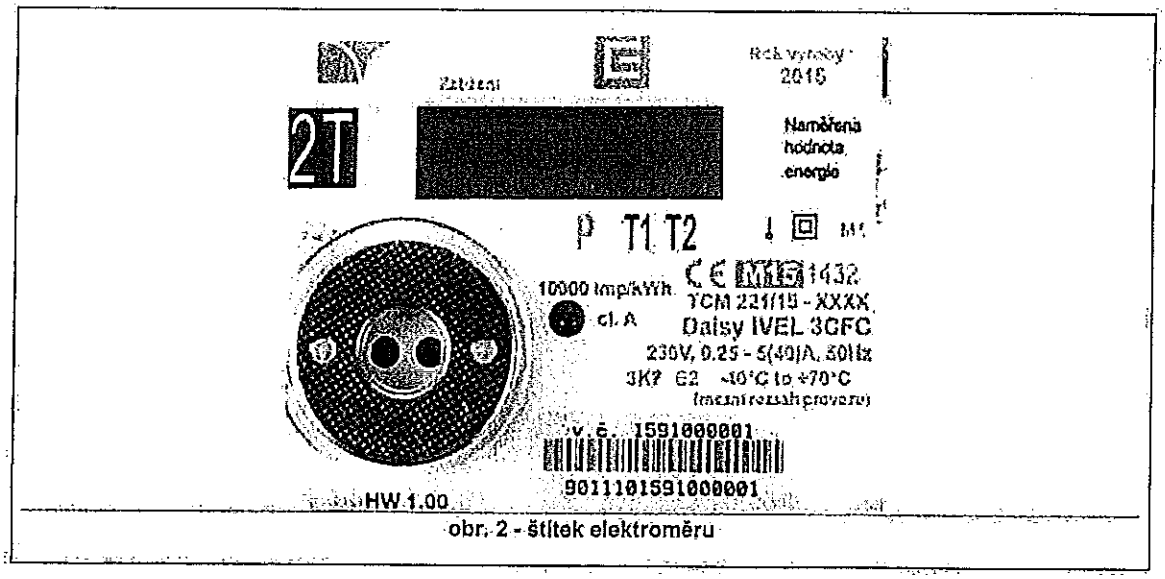
Tel.: 266 104 111
Fax: 284 680 070
www.ezu.cz

1. Popis vzorku

Ke zkouškám byl předložen jednofázový statický elektroměr, typ Daisy IVEL 3CFC, sériové číslo 1591000001.



obr. 1 - elektroměr



obr. 2 - štítek elektroměru

2. Zkoušení

2.1. Mechanické zkoušky

2.1.1. Zkouška pružinovým kladívkem

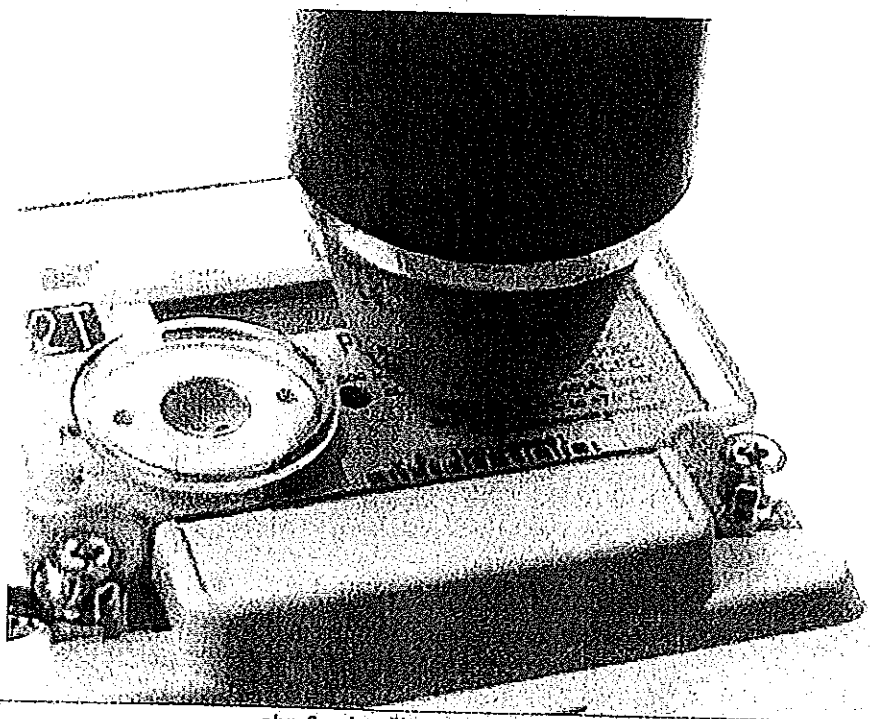
podle ČSN EN 60068-2-75:1999,
parametry podle ČSN EN 50470-1:2007, čl. 5.2.2.1

Zkušební zařízení:
pružinové kladívko, typ F 22,50, inv. č. DKP 4995

Parametry zkoušky:
zkouška Eh
zkoušení: viz obr. 3
energie úderu: (0,2 J ±0,02) J
počet úderů: tři na každém místě
místa úderů: kryt elektroměru, kryt svorkovnice, kryt displeje

Zjištění:
V průběhu zkoušky nedošlo k poškození krytů.

vyhovuje



obr. 3 - zkouška pružinovým kladívkem

vypracoval: J. Šašek

2.1.2. Zkouška rázy

podle ČSN EN 60068-2-27 ed. 2:2010,
parametry podle ČSN EN 50470-1:2007 čl. 5.2.2.2

Zkušební zařízení:

vibrační testovací systém LDS-V830-335 SPA8-16K, inv. č. 110128/1-5
řídicí systém PUMA, inv. č. 6254
snímač zrychlení PCB Piezotronics 353B33, inv. č. 551333

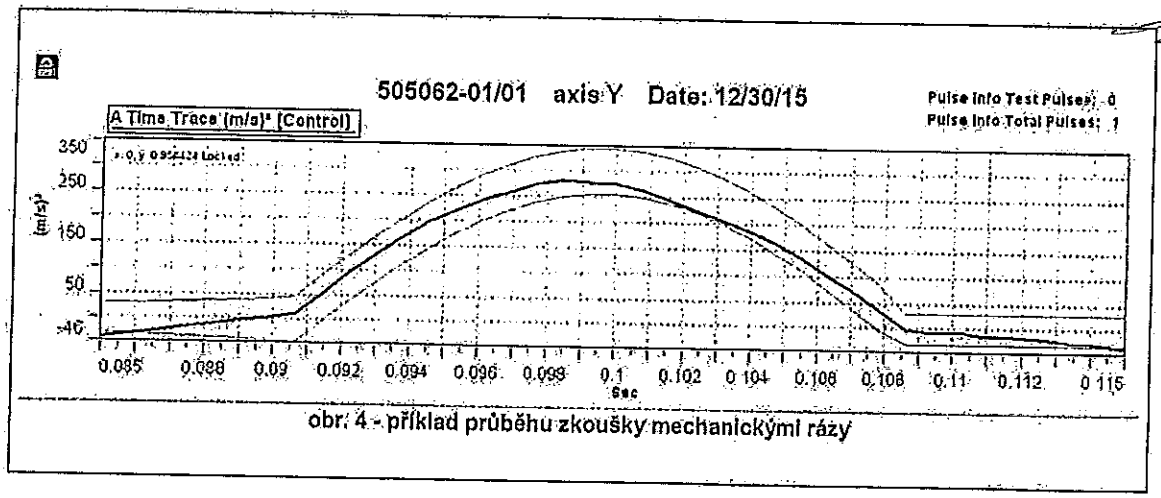
Parametry zkoušky:

zkouška Ea
tvar pulsu: půlsinus
špičkové zrychlení: 30 g
šířka pulsu: 18 ms
počet rázů: 3 v každém směru v kladném i záporném smyslu
upevnění vzorku: viz obr. 5, 6 a 7
průběh rázů: viz obr. 4
Po zkoušce byla provedena funkční zkouška.

Zjištění:

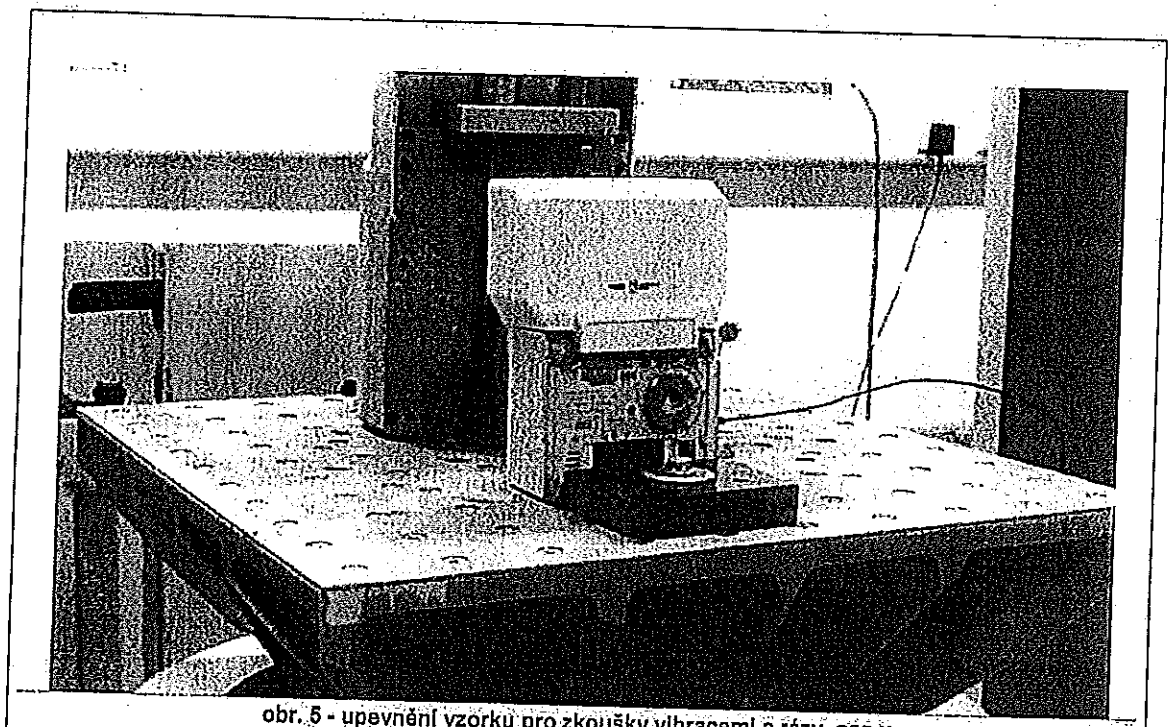
Elektroměr je po zkoušce rázy funkční.

vyhovuje

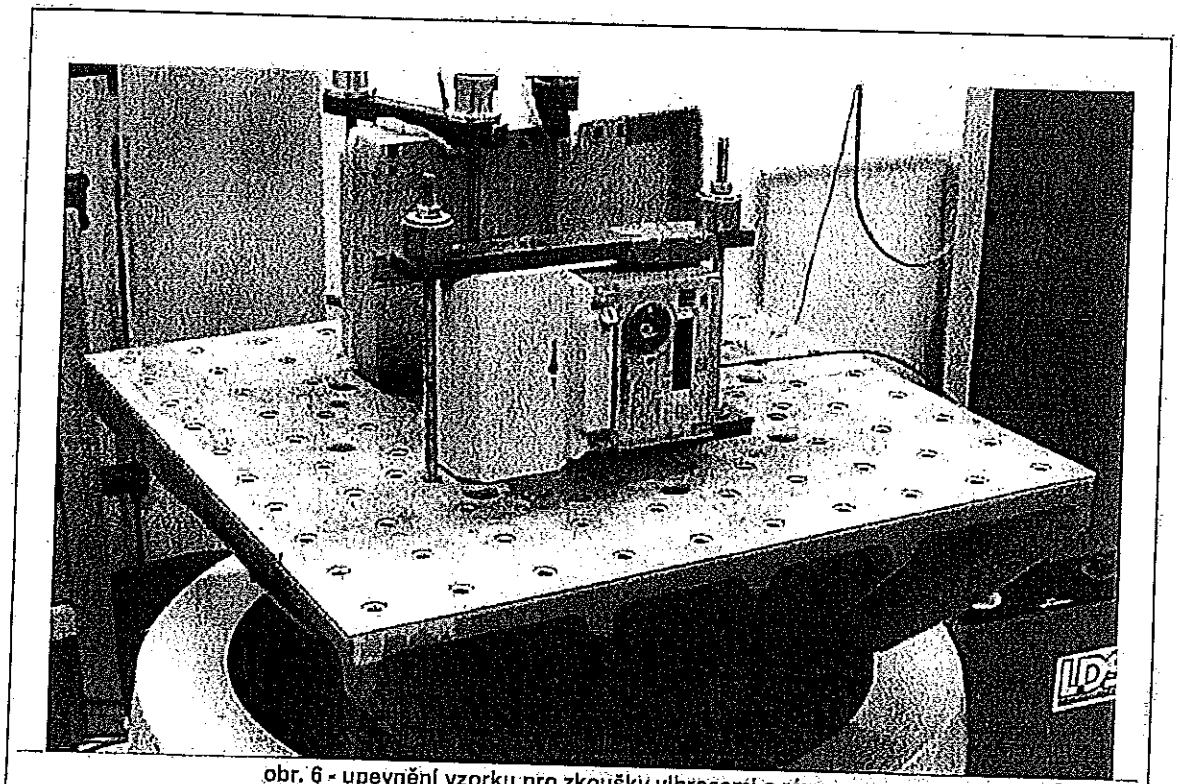


obr. 4 - příklad průběhu zkoušky mechanickými rázy

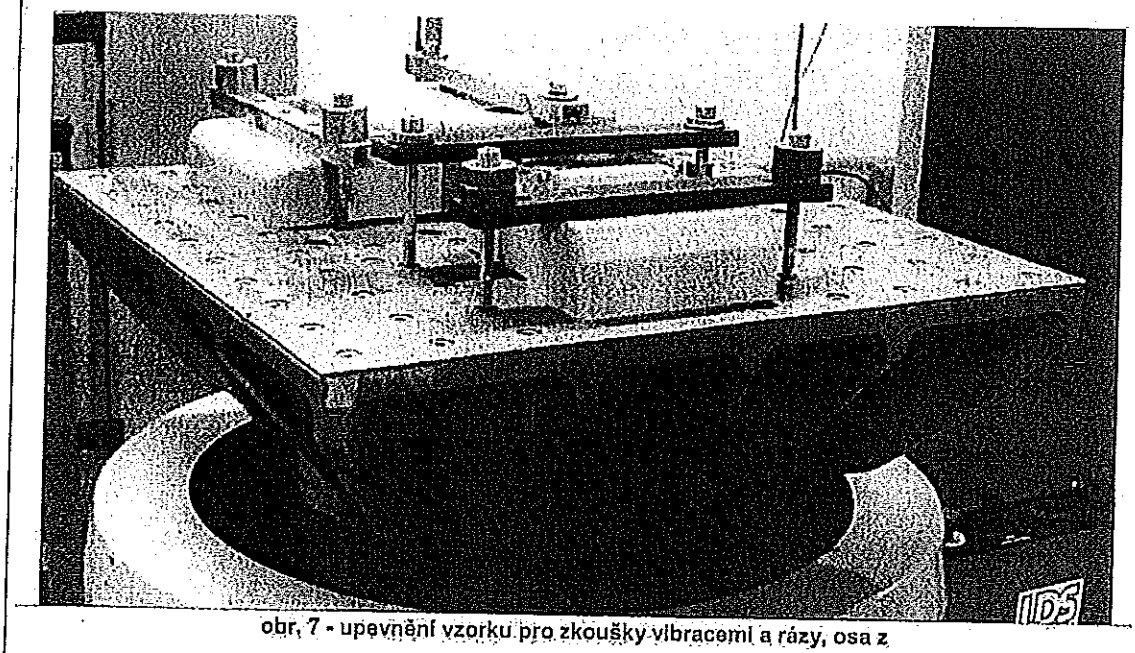
vypracoval: J. Šašek



obr. 5 - upevnění vzorku pro zkoušky vibracemi a rázy, osa x



obr. 6 - upevnění vzorku pro zkoušky vibracemi a rázy, osa y



obr. 7 - upevnění vzorku pro zkoušky vibracemi a rázy, osa z

2.1.3. Zkouška vibracemi

podle ČSN EN 60068-2-6 ed. 2:2008,
parametry podle ČSN EN 50470-1:2007 čl. 5.2.2.3

Zkušební zařízení:

vibrační testovací systém LDS-V830-335 SPA8-16K, inv. č. 110128/1-5
řídicí systém PUMA, inv. č. 6254
snímač zrychlení PCB Piezotronics 353B33, inv. č. 551333

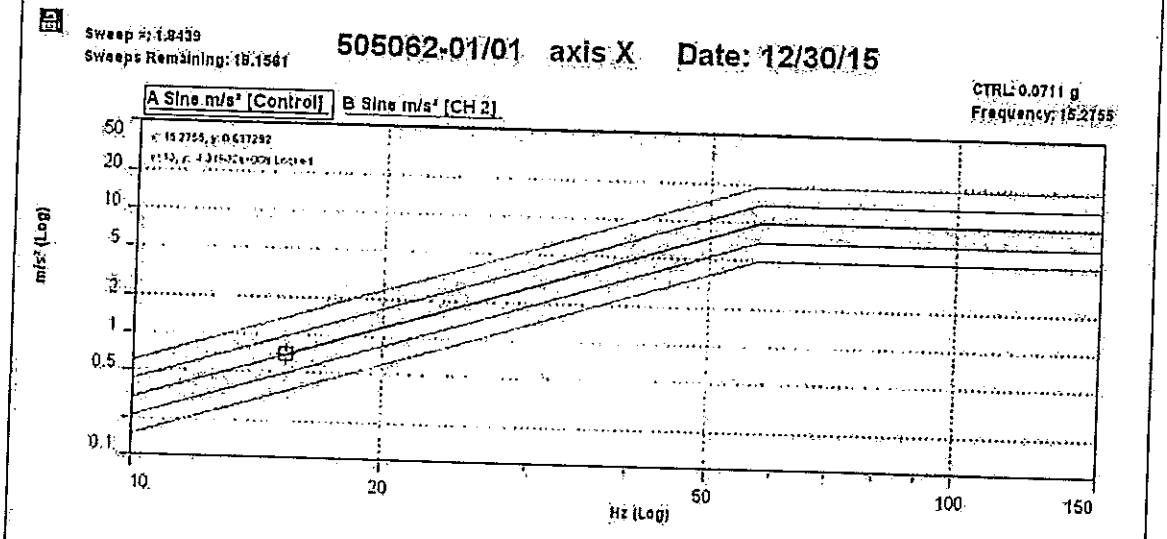
Parametry zkoušky:

zkouška Fc
rozsah kmitočtů: 10 až 150 Hz
přechodový kmitočet: 60 Hz
$f < 60$ Hz, konstantní amplituda pohybu 0,075 mm
$f > 60$ Hz, konstantní zrychlení 9,8 $m \cdot s^{-2}$
počet cyklů rozmítání na osu: 10
upevnění vzorku: viz obr. 5, 6 a 7
průběh vibrací: viz obr. 8
Po zkoušce byla provedena funkční zkouška.

Zjištění:

Elektroměr je po zkoušce vibracemi funkční.

vyhovuje



obr. 8 - příklad průběhu zkoušky vibracemi

vypracoval: J. Šašek

2.2. Ochrana proti vniknutí prachu a vody

2.2.1. Zkouška ochrany před vniknutím prachu - IP 5X

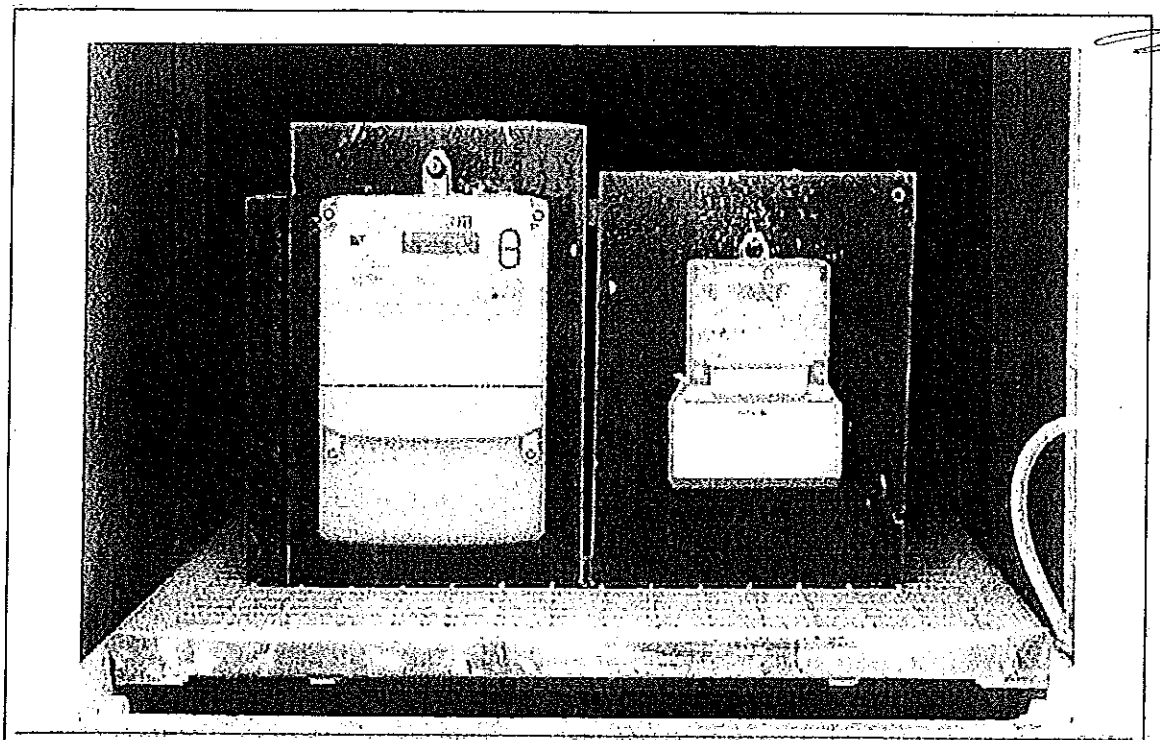
podle ČSN EN 60529:1993 +A1:2001 +A2:2014, čl. 13.4 a 13.5
parametry podle ČSN EN 50470-1:2007, čl. 5.9, písm. a)

Zkušební zařízení:
prachová komora VST 1150, Inv. č. 834490

Parametry zkoušky:
Vzorek byl zkoušen v pracovní poloze, upnut na umělou stěnu.
umístění vzorku v prachové komoře: viz obr. 9
prachová náplň komory: mastek
teplota / relativní vlhkost během zkoušky: 55 °C / 30 %
kryt kategorie 2: bez podtlaku
trvání zkoušky: 8 h

Zjištění:
V průběhu zkoušky nedošlo k vniknutí škodlivého množství prachu pod kryt vzorku.

vyhovuje



obr. 9 - vzorek po zkoušce IP 5X

vypracoval: J. Šašek

2.2.2. *Zkouška ochrany proti svisle padajícím vodním kapkám - IP X1*

podle ČSN EN 60529:1993 +A1:2001 +A2:2014, čl. 14.2, 14.2.1 a 14.3
parametry podle ČSN EN 50470-1:2007, čl. 5.9, písm. b)

Zkušební zařízení:

kapací vana, inv. č. 662866
stopky SECCO, č. kal. N700477

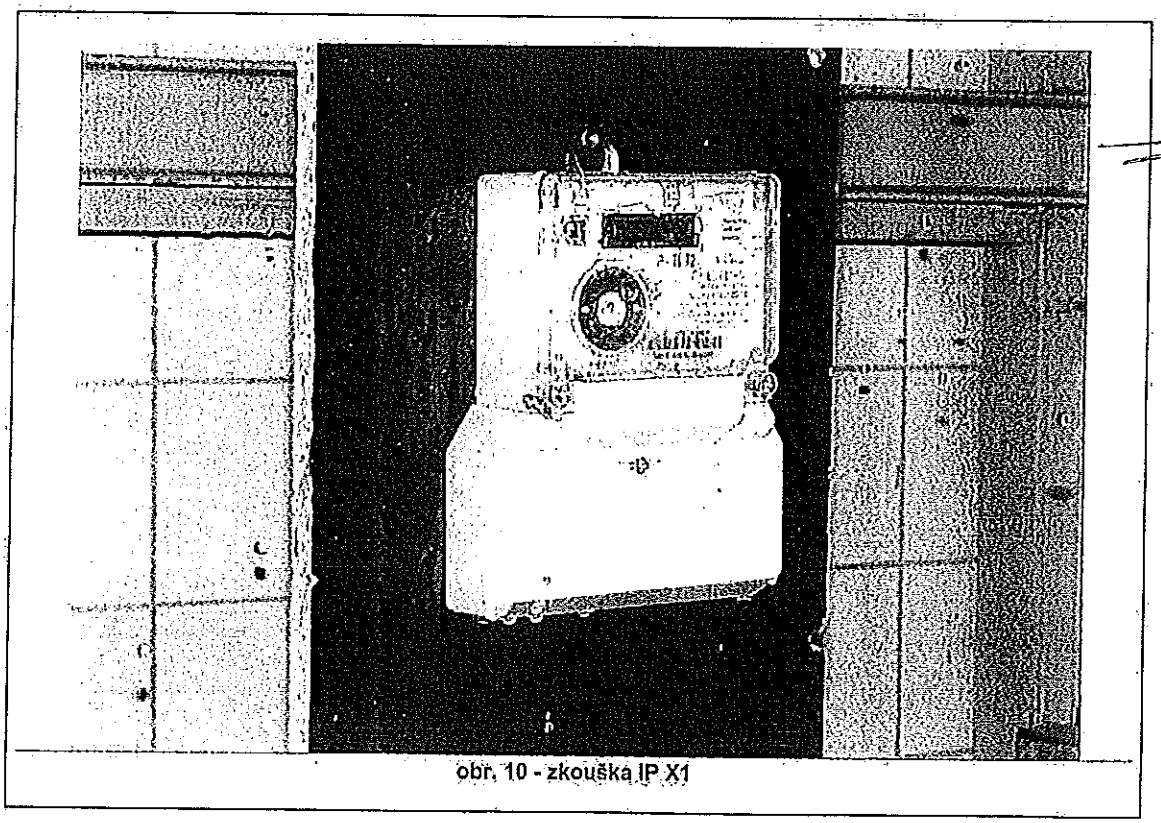
Parametry zkoušky:

Vzorek byl zkoušen v pracovní poloze, upnut na umělou stěnu.
průtok vody: 1 $mm \cdot min^{-1}$
zkoušení: viz obr. 10
trvání zkoušky: 10 min
Bezprostředně po zkoušce byla provedena zkouška napěťovým impulzem (viz oddíl 2.4.1).

Zjištění:

V průběhu zkoušky nedošlo k vniknutí škodlivého množství vody pod kryt vzorku.

vyhovuje



obr. 10 - zkouška IP X1

vypracoval: J. Šašek

2.3. Klimatické zkoušky

2.3.1. Zkouška vlhkým teplem cyklickým

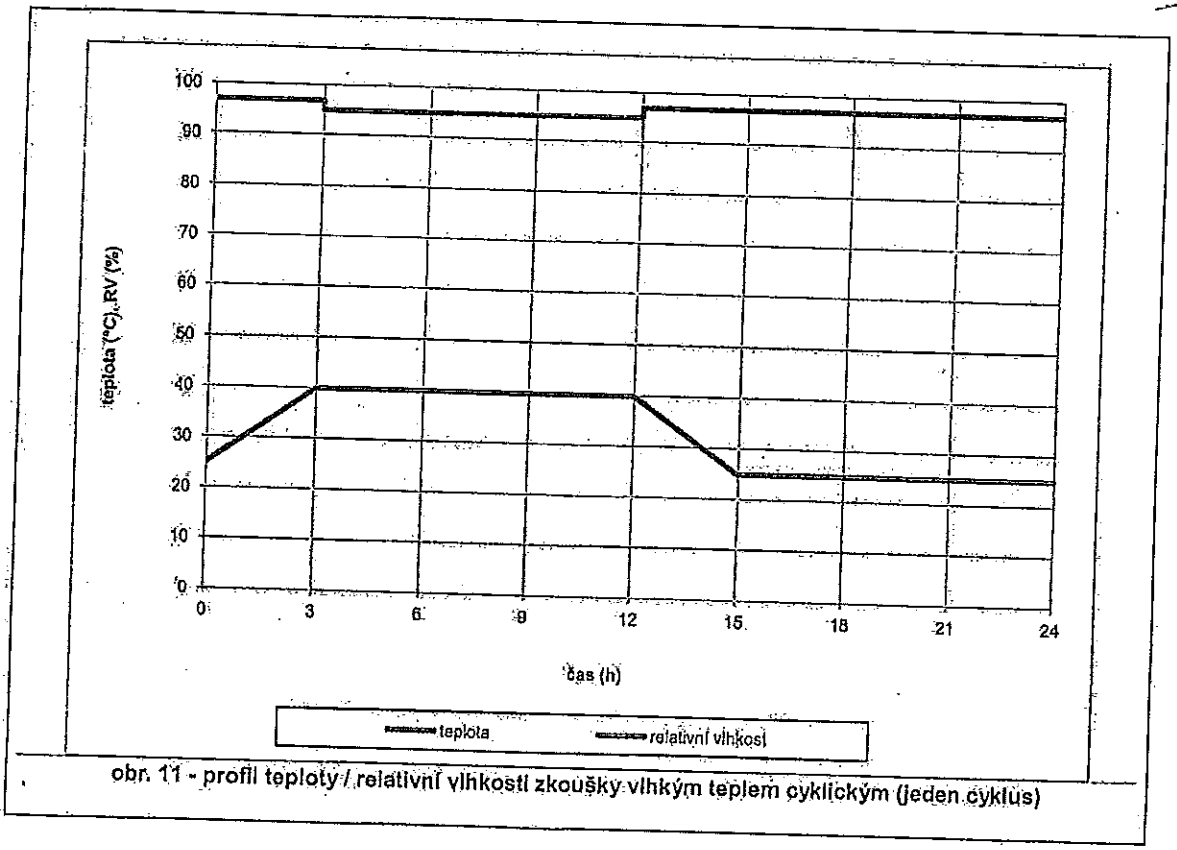
podle ČSN EN 60068-2-30 ed. 2:2006
parametry podle ČSN EN 50470-1:2007 čl. 6.3.4

Zkušební zařízení:
klimatická komora WK 11-600/70/OZ, inv. č. 110061

Parametry zkoušky:
zkouška Db, varianta 1
horní teplota: (40 ±2) °C
trvání cyklu: 24 h
počet cyklů: 6
profil zkušebního cyklu: viz obr. 11
V průběhu zkoušky byl vzorek připojen na AC 230 V, 50 Hz.
Po zkoušce byla provedena funkční zkouška.

Zjištění:
Elektroměr je po zkoušce vlhkým teplem cyklickým funkční.
Zkouška napěťovým impulzem před zkouškou a po zkoušce vlhkým teplem cyklickým je popsána v oddílu 2.4.1.

vyhovuje



obr. 11 - profil teploty / relativní vlhkosti zkoušky vlhkým teplem cyklickým (jeden cyklus)

vypracoval: J. Šašek

2.4. Zkoušky izolace

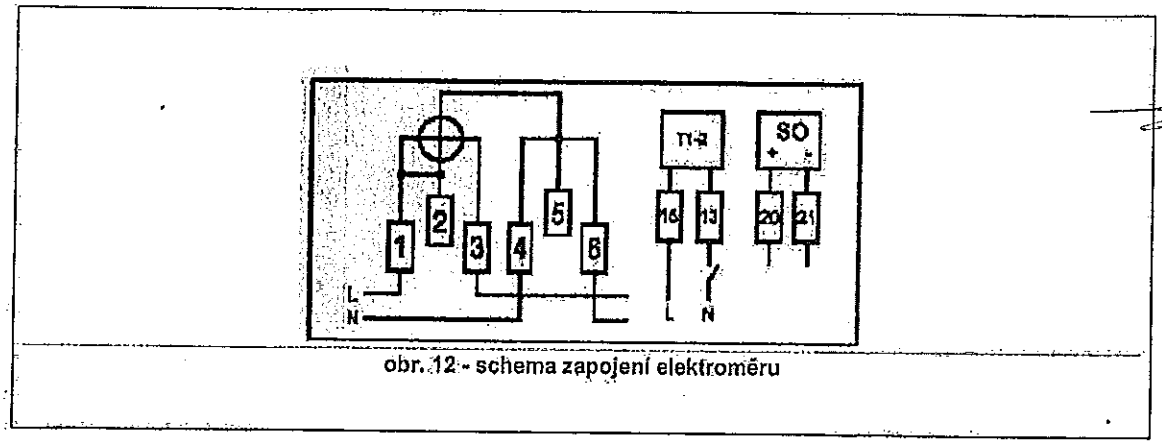
2.4.1. Zkouška napěťovým impulzem elektrických obvodů proti zemi
podle ČSN EN 50470-1:2007 čl. 7.3.3.3

Zkušební zařízení:
generátor rázové vlny RG 542, inv. č. 110269

Parametry zkoušky:
zkušební napětí: 6 kV (před zkouškou vlhkým teplem cyklickým, po zkoušce IP X1)
4,8 kV (24 h po dokončení zkoušky vlhkým teplem cyklickým)
tvar impulzu: 1,2/50 µs
aplikace impulzu: svorky č. 1, 2, 3, 4, 5, 6, 13 a 15 proti 20, 21 a kryt elektroměru

Zjištění:
Během zkoušek nedošlo k přeskoku ani průrazu.

vyhovuje



obr. 12 - schema zapojení elektroměru

3. Výsledek zkoušky

Na předloženém jednofázovém statickém elektroměru, typ **Daisy IVEL 3CFC**, sériové číslo 1591000001, byly provedeny zkoušky podle výše uvedených norem. Kde bylo vyžadováno normou, byla provedena zkouška funkce.

Elektroměr ***vyhověl*** všem výše uvedeným zkouškám.

Zkoušel: J. Šašek

konec protokolu o zkoušce

vypracoval: J. Šašek

Zkoušky elektromagnetické kompatibility
Tests of Electromagnetic Compatibility

Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia: Protokol o zkoušce č. 936/12.10.2015 (15 listů) + č. 936A/12.10.2015 (15 listů) + Application I (40 listů)

Bulgarian Institute of Metrology, Accredited EMC Testing Laboratory, Sofia: Test Report No. 936/12.10.2015(15 pages) + No. 936A/12.10.2015 (15 pages) + Application I (40 pages)

BULGARIAN INSTITUTE OF METROLOGY

ACCREDITED EMC TESTING LABORATORY
Sofia, quarter "Poligona", 2 "Prof. P. Mutafchiev" str.
Certificate for accreditation reg No 257 ЛИ / 20.05.2014 /Valid until 20.05.2018
issued by EA BAS according to requirements of standard BDS EN ISO/IEC 17025:2006

TEST REPORT

936 / 12.10.2015

1. Equipment under test:	Single phase static electricity meter type: DAISY IVEL 3CFC
2. Applicant:	Daisy Technology Ltd. Sofia, 15-17 Tintlava str.
3. Manufacturer:	Daisy Technology Ltd. Sofia, 15-17 Tintlava str.
4. Standards:	**BDS EN 50470-1:2006** **Electricity metering equipment (a.c.) . Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)** **BDS EN 50470-3:2006** **Electricity metering equipment (a.c.) - Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)**
5. Number of tested sample:	1 sample., S/N 1560000002
6. Number and date of order:	№ АУ-02-1194 / 15.06.2015
7. Date of receiving EUT:	04.09.2015
8. Date of measurement:	04.09.2015, 07.09 – 11.09.2015, 09.10.2015

Head of EMC Testing laboratory:

Assoc. Prof. Nikolai Panteleev Ph.D. .....

e-mail: emclab@abv.bg
Phone /fax (+359 2) 8762 819
http://www.blm.government.bg

9. Applied standards for used testing methods

BDS EN 50470-1:2006	Electricity metering equipment (a.c.) . Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)
BDS EN 55022:2010	Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement
BDS EN 61000-4-2:2009	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques. Electrostatic discharge immunity test
BDS EN 61000-4-4:2012	Electromagnetic compatibility (EMC) Part 4-4: Testing and measurement techniques. Electrical fast transient /burst immunity test
BDS EN 61000-4-5:2007	Electromagnetic compatibility (EMC) Part 4-5: Testing and measurement techniques. Surge immunity test
BDS EN 61000-4-11:2006	Electromagnetic compatibility (EMC) Part 4-11: Testing and measurement techniques Voltage dips, short interruptions and voltage variations immunity tests

10. Test condition

10.1 Environmental condition

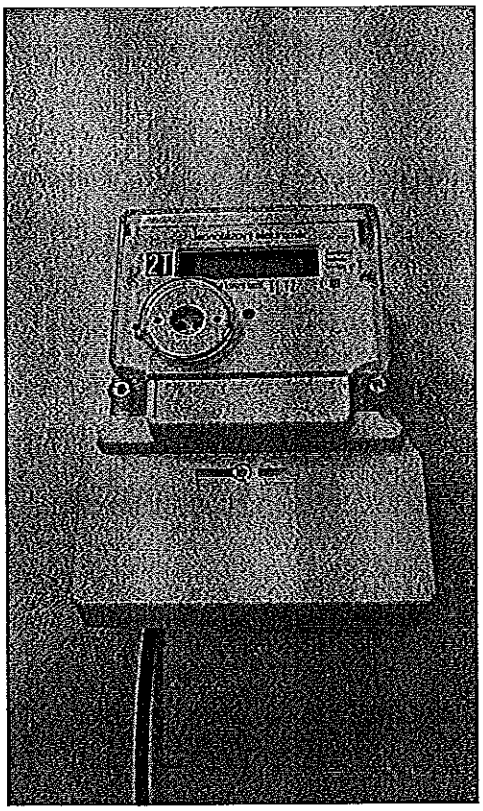
Temperature	from 18,6 °C to 28,0 °C
Relative humidity	from 36,0 % to 55,8 %
Pressure	from 94,8 kPa to 95,4 kPa

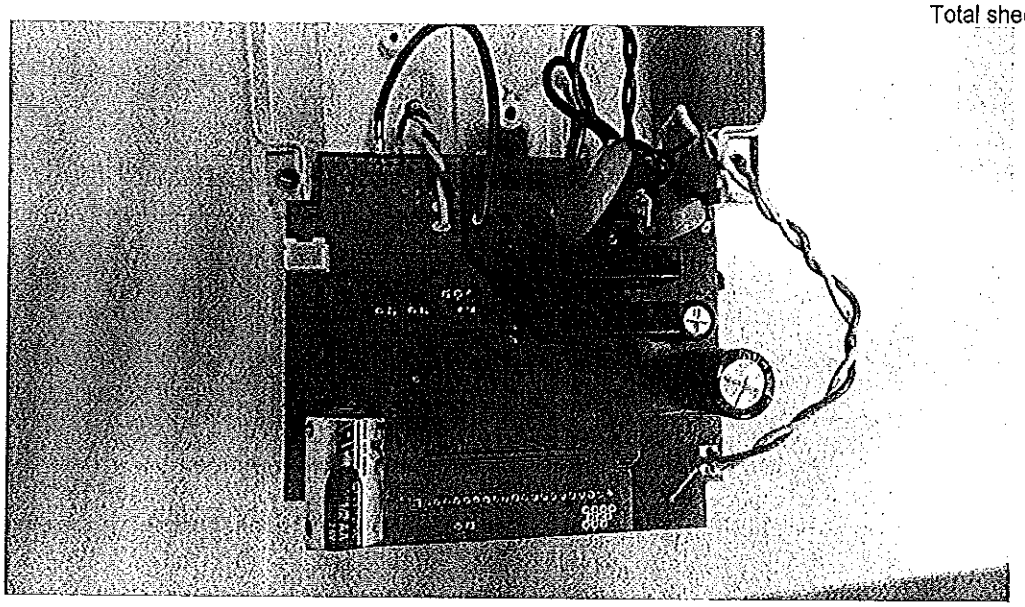
10.2 Power Supply:

Single phase static electricity meter type DAISY IVEL 3CFC is powered by 230 V.

10.3 Configuration

Standard	Method	Working condition
BDS EN 50470-1- art. 7.4.13	BDS EN 55022	I = 0,1 Iref = Itr = 0.5A without additional equipment
BDS EN 50470-1- art. 7.4.5	BDS EN 61000-4-2	I = 0 A open circuit
BDS EN 50470-1- art. 7.4.7	BDS EN 61000-4-4	I = 0 A open circuit
BDS EN 50470-1- art. 7.4.9	BDS EN 61000-4-5	I = 0 A open circuit
BDS EN 50470-1- art. 7.4.4	BDS EN 61000-4-11	I = 0 A open circuit





11. RESULTS

CONTENTS

11.1 Conducted emission disturbances in frequency range 150 kHz – 30 MHz

Standard:	BDS EN 50470-1:2006 – art. 7.4.13
Method:	BDS EN 55022:2010– art. 9
Limits:	BDS EN 55022:2010- Class B, art. 5.1, table 2
Index:	Continuous conducted disturbances on power supply ports
Measurement unit:	dBμV
Frequency range:	150 kHz – 30 MHz
Measurement instruments characteristics:	▪ Detectors: Peak detector in compliance with art. 5 of BDS EN 55016-1-1:2010+A1:2011+A2:2015 Quasi-peak detector in compliance with art. 4 of BDS EN 55016-1-1:2010+A1:2011+A2:2015 ▪ LISN (50 Ω/(50 μH+5Ω)) ± 20% in compliance with art. 4.2 of BDS EN 55016-1-2+A1:2006
Result:	None deviation from the limit have been registered
Measurement uncertainty:	U = 3,93 dB
Deviation from the method:	None deviation from the method
Notes:	Measurements have been performed consequently in L and N.

11.1.1 Used test equipment:

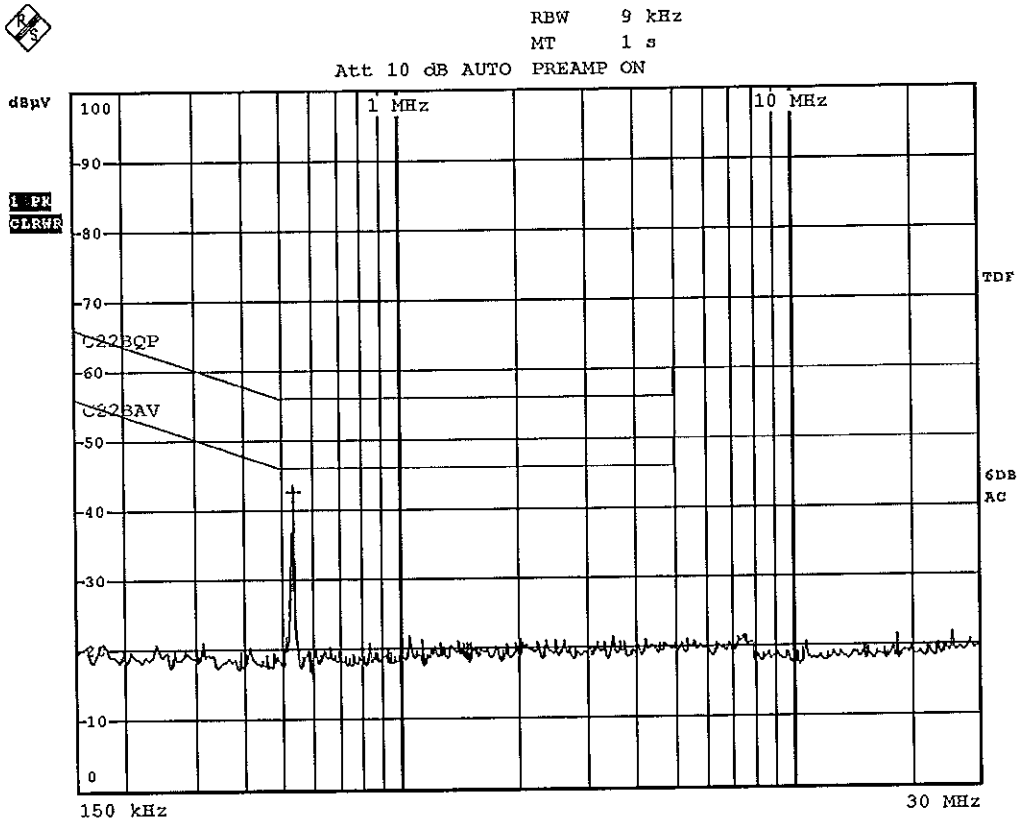
Type	Model	Manufacturer	S/N	Certificate for calibration
Measuring receiver	**SCR 3502**	SCHAFFNER MEB BERLIN GmbH	231	0266-D-K-15195-01-00/2015-08 19.08.2015/Rohde&Schwarz
Transient limiter	**CFL 9206A**	TESEQ GmbH	26709	
LISN	**NNB 42**	TESEQ GmbH	00015	

11.1.2 Used software:

Manufacturer	Name	Version	Year/Build
Schaffner-Chase EMC	Emission Software CES9985	1.31	1999

RESULTS

Continuous conducted disturbances measurements – L



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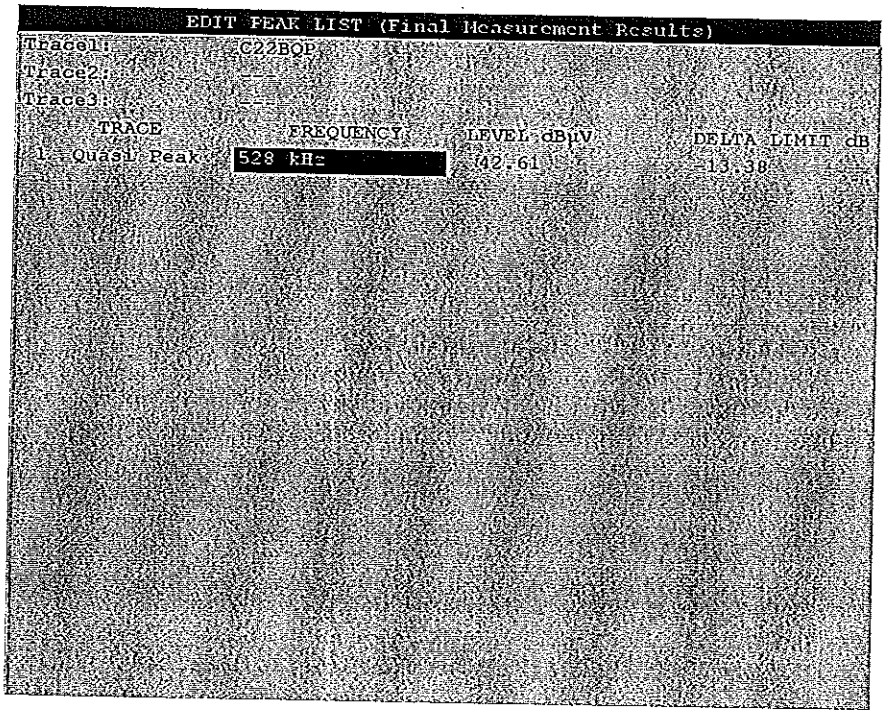

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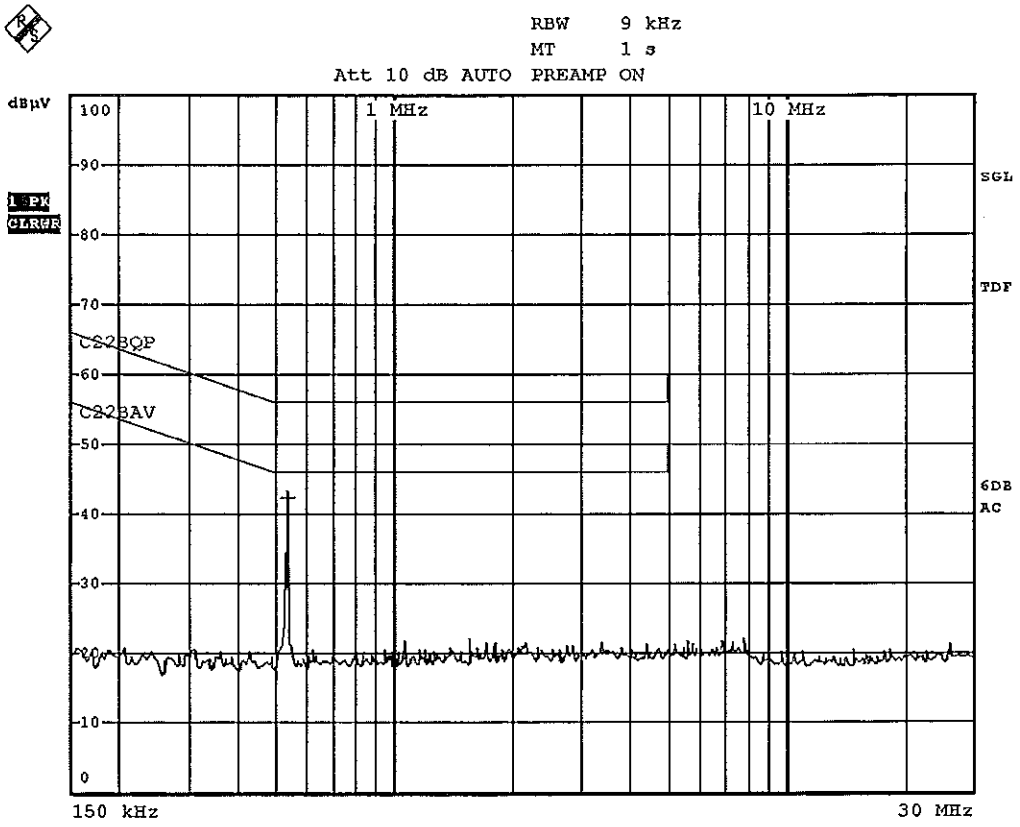
Continuous conducted disturbances measurements – N



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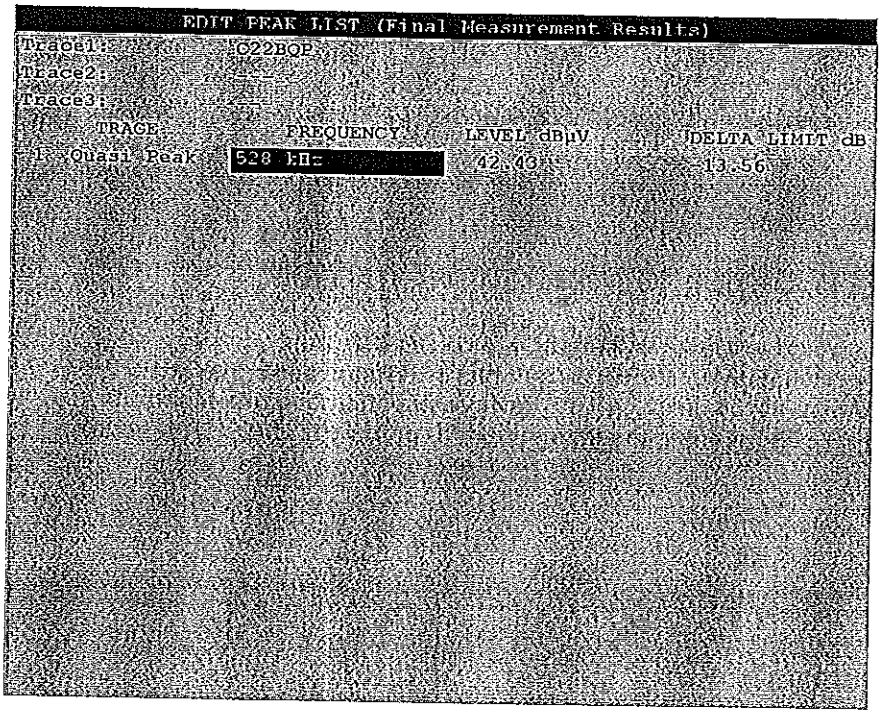

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11.2 . ESD immunity test

Standard:	BDS EN 50470-1:2006 – art. 7.4.5	
Method:	BDS EN 61000-4-2:2009	
Performance criteria:	Criteria for performance characteristics evaluation in accordance with art. 7.4.5 of BDS EN 50470-1:2006	
ESD characteristics:		
Amplitude:	± 8 kV contact discharge	± 15 kV air discharge
Polarity:	Positive/negative	Positive/negative
Repetition period:	1s	

Testing points:	Discharge	Points	Application method	Discharge for each polarity
HCP[1]	Contact	4	Indirect	10
VCP[2]	Contact	4	Indirect	10
Enclosure, display, fixing screws	Air	3	Direct	No discharge

Result:	During the test no denials have been registered
Uncertainty:	First peak current of discharge < 10 % Current at 30 ns < 30 % Current at 60 ns < 30 % Indicated voltage ± 5 % Permissible limit for rise time t_r with discharge switch– from 0, 7ns to 1 ns
Deviation from method:	None deviation from the method
Notes:	

11.2.1 Used test equipment:

Type	Model	Manufacturer	S/N	Certificate for calibration
ESD generator	**ESD3000**	EMC Partner AG	141	4-2061 / 15.01.2014 EMC Partner AG

[1] Horizontal coupling plane
[2] Vertical coupling plane

11.3. BURST Immunity test

Standard:	BDS EN 50470-1:2006 – art. 7.4.7
Method:	BDS EN 61000-4-4:2012
Performance criteria:	Criteria for performance characteristics evaluation in accordance with art. 7.4.7 of BDS EN 50470-1:2006
BURST characteristics:	
BURST wave form:: T_r / T_d	Double exponential 5 ns / 50 ns
Burst duration:	15 ms
Burst period:	300 ms
Repetition rate:	5 kHz
Testing lines:	Power supply lines L, N, L+N
Application method:	CDN
Amplitude:	4 kV
Polarity:	positive / negative
Test time:	60 s for each polarity
Result:	During the test no denials have been registered
Uncertainty:	Rise time of one pulse < 30% Impulse duration (50% value) < 30% Peak output voltage (50 Ω) < 10% BURST duration and BURST period < 20% Repetition rate of the impulses < 20%
Deviation from the method:	Unloaded current circuits, standard meter have not been used.
Notes:	

11.3.1 Used test equipment:

Type	Model	Manufacturer	S/N	Certificate for calibration
Test system	**NSG2050**	Schaffner Electrotest GmbH	200541-553LU	LA5637G/31.01.2013 Teseq Ltd
Burst generator	**PNW2225**	Schaffner Electrotest GmbH	200545-545LU	LA5637G/31.01.2013 Teseq Ltd
CDN	**CDN133**	Schaffner Electrotest GmbH	34376	

11.3.2 Used software

Manufacturer	Name	Version	Year/Build
Schaffner EMC Lnc.	WIN 2050	6.00	2005

11.4. SURGE immunity test

Standard:	BDS EN 50470-1:2006 – art. 7.4.9
Method:	BDS EN 61000-4-5:2007
Performance criteria:	Criteria for performance characteristics evaluation in accordance with art. 7.4.9 of BDS EN 50470-1:2006
SURGE characteristics:	Double exponential
SURGE wave form:	
Front time T_1:	1,2 μs
Time to half value T_2:	50 μs
Testing lines:	Power supply lines
Application method	CDN
Amplitude:	4 kV L-N
Repetition period:	10 s
Phase angle:	60°/240°
Polarity:	positive / negative
Test time	5 pulses for each polarity and phase angle
Result:	During the test no denials have been registered
Uncertainty:	Open circuit output voltage < 10 % Output voltage rise time (10% - 90%) T_1 < 30 % Duration of output voltage variation (50% - 50%) T_2 < 20 % Short circuit output current < 10 % Short circuit current rise time (10% -90%) < 20 % Duration of output current variation (50% - 50%) < 20 %
Deviation from the method:	None deviation from the method
Notes:	

11.4.1 Used test equipment:

Type	Model	Manufacturer	S/N	Certificate for calibration
Test system	**NSG2050**	Schaffner Electrotest GmbH	200541-553LU	LA5637F/31.01.2013 Teseq Ltd
SURGE generator	**PNW2050**	Schaffner Electrotest GmbH	200543-569LU	LA5637F/31.01.2013 Teseq Ltd
CDN	**CDN133**	Schaffner Electrotest GmbH	34376	

11.4.2 Used software

Manufacturer	Name	Version	Year/Build
Schaffner EMC Lnc.	WIN 2050	6.00	2005

11.5 Voltage DIPS and short interruptions immunity test

Standard:	BDS EN 50470-1:2006 – art. 7.4.4 a), art. 7.4.4 b), art. 7.4.4 c)		
Method:	BDS EN 61000-4-11:2006		
DIPS characteristics:			
Performance criteria:	Criteria for performance characteristics evaluation in accordance with art. 7.4.4 of BDS EN 50470-1:2006		
Reduction Ut:	100 %	100 %	50 %
Duration:	940 ms	20 ms	
Nbr:	3	1	1
Repetition period:	1000 ms	-	-
Working regimes:	Test mode		
Result:	During the test no denials have been registered		
Uncertainty:	Output voltage < 7 %		
Deviation from the method:	For art. 7.4.4 a) repetition of interruption is 940 ms		
Notes:			

11.5.1 Used test equipment

Type	Model	Manufacturer	S/N	Certificate for calibration
Test system	**NSG2050**	Schaffner Electrotest GmbH	200541-553LU	LA5637E/31.01.2013 Teseq Ltd
Voltage DIPS and short interruptions generator	**PNW2003**	Schaffner Electrotest GmbH	200524-508LU	LA5637E/31.01.2013 Teseq Ltd
External autotransformer	**NSG642**	Schaffner Electrotest GmbH	3092009-4548	LA5637E/31.01.2013 Teseq Ltd

11.5.2 Used software:

Manufacturer	Name	Version	Year/Build
Schaffner EMC Lnc.	WIN 2050	6.00	2005

NOTES:

1. The results could be related only to the testing sample.
2. Coping of the test report forbidden without written consent of the testing laboratory.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Test performed by:

Assoc. Prof. I. Dochev Ph.D .....

Head of EMC Testing laboratory:

Assoc. Prof. N. Panteleev Ph.D. .....

Български институт по метрология ИЛ за ЕМС София

BULGARIAN INSTITUTE OF METROLOGY

EMC TESTING LABORATORY
Sofia, quarter "Poligona", 2 "Prof. P. Mutafchiev" str.

TEST REPORT

936A / 12.10.2015

1. Equipment under test:	Single phase static electricity meter type: DAISY IVEL 3CFC
2. Applicant:	Daisy Technology Ltd. Sofia, 15-17 Tintlava str.
3. Manufacturer:	Daisy Technology Ltd. Sofia, 15-17 Tintlava str.
4. Standards:	**BDS EN 50470-1:2006** **Electricity metering equipment (a.c.) . Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)** **BDS EN 50470-3:2006** **Electricity metering equipment (a.c.) - Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)**
5. Number of tested sample:	1 sample., S/N 1560000002
6. Number and date of order:	№ АУ-02-1194 / 15.06.2015
7. Date of receiving EUT:	04.09.2015
8. Date of measurement:	04.09.2015, 07.09 – 11.09.2015, 09.10.2015

Head of EMC Testing laboratory:

Assoc. Prof. Nikolai Panteleev Ph.D. .....

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9. Applied standards for used testing methods

BDS EN 50470-1:2006	Electricity metering equipment (a.c.) . Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)
BDS EN 55022:2010	Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement
BDS EN 61000-4-20:2010	Electromagnetic compatibility (EMC) Part 4-20: Testing and measurement techniques – Emission and immunity testing in transverse electromagnetic (TEM) waveguides
BDS EN 61000-4-3:2006+ A1:2008 +A2:2010	Electromagnetic compatibility (EMC Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
BDS EN 61000-4-6:2009	Electromagnetic compatibility (EMC) Part 4-6: Testing and measurement techniques. Immunity to conducted disturbances, induced by radio-frequency field

10. Test condition

10.1 Environmental condition

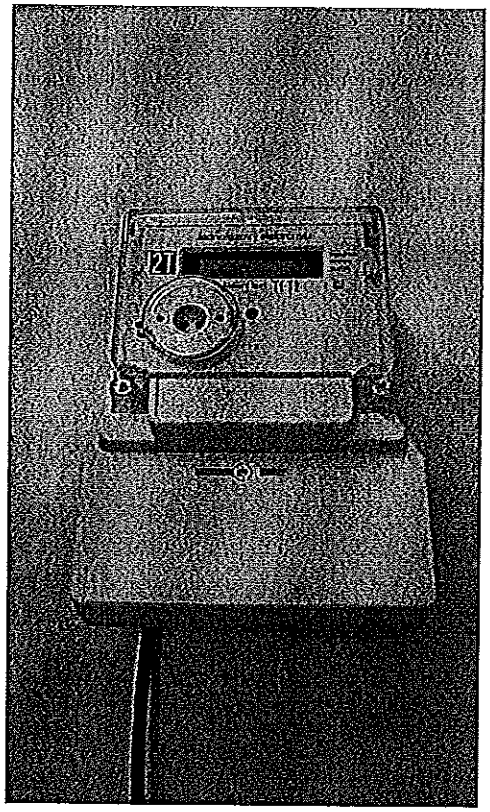
Temperature	from 18,6 °C to 28,0 °C
Relative humidity	from 36,0 % to 55,8 %
Pressure	from 94,8 kPa to 95,4 kPa

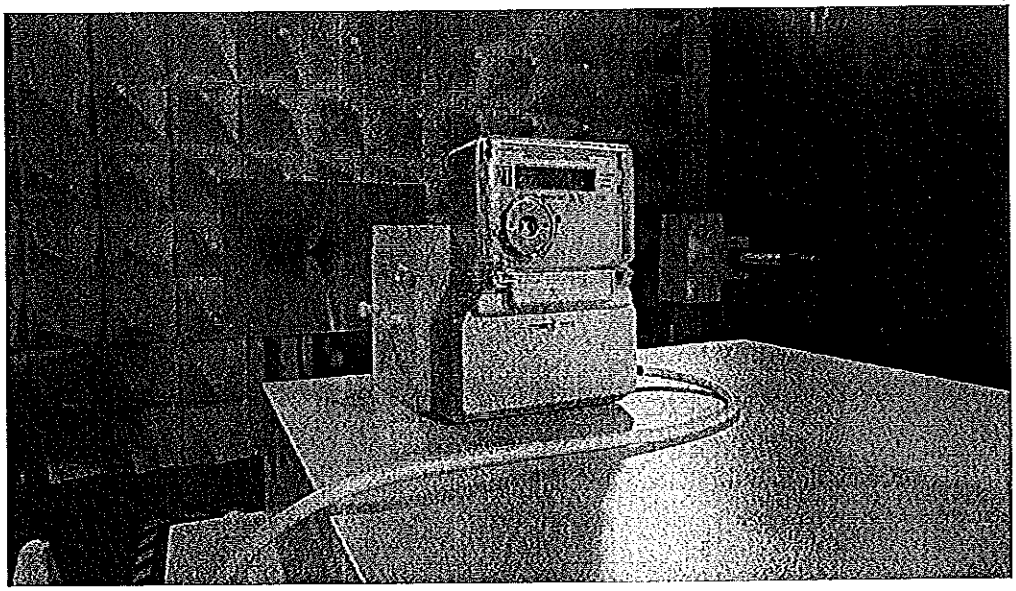
10.2 Power Supply:

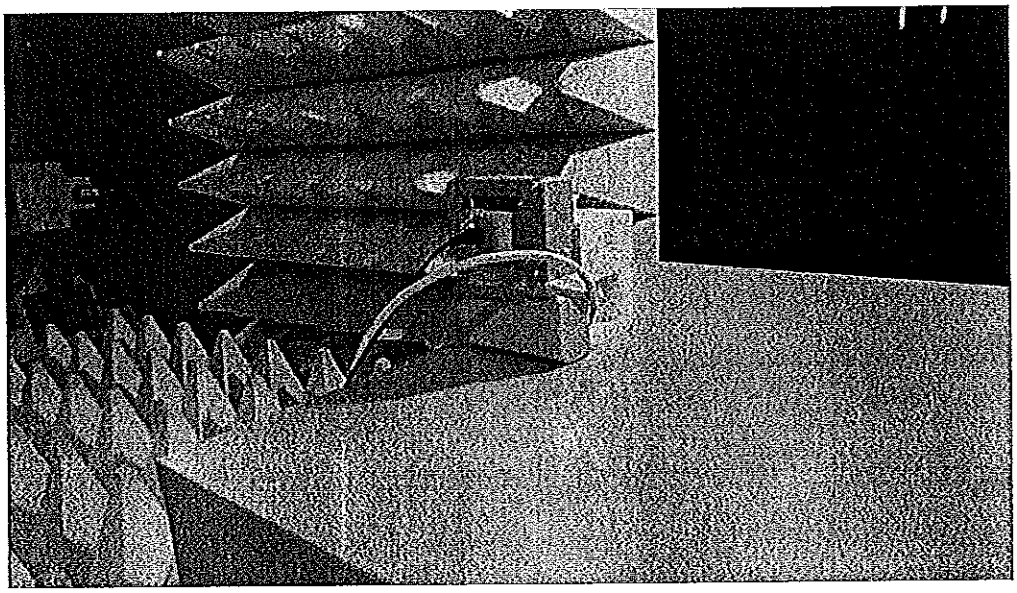
Single phase static electricity meter type DAISY IVEL 3CFC is powered by 230 V.

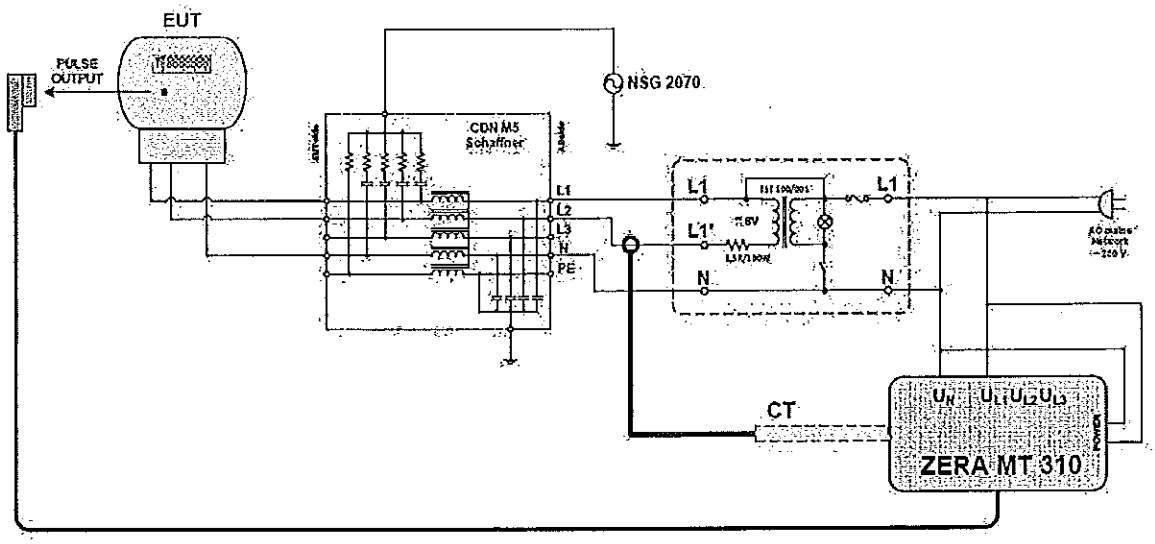
10.3 Configuration

Standard	Method	Working condition
BDS EN 50470-1- art. 7.4.13	BDS EN 55022	I = 0,1 *Iref = 0.5 A
BDS EN 50470-1- art. 7.4.6	BDS EN 61000-4-3	Level 10 V/m, art. 7.4.6 a) I = 5 A, U_{nom} = 230 V, PF = 1
BDS EN 50470-1- art. 7.4.8	BDS EN 61000-4-6	Level 30 V/m, art. 7.4.6 b) I = 0 A open circuit I = 5A , U_{nom} = 230 V PF = 1









Test set-up diagram for conducted radio-frequency electromagnetic field immunity test according to BDS EN 50470-1- art. 7.4.8

11. RESULTS

CONTENTS

11.1 Radiated emission disturbances in frequency range 30 MHz – 1 GHz

Standard:	BDS EN 50470-1:2006 – art. 7.4.13
Method:	BDS EN 61000-4-20:2010 GTEM cell with correlation of measurement results with 10 m Open Area Test Sites
Limits:	BDS EN 55022:2010– Class B, art. 6.1, table 6
Measurement unit:	dBμV/m
Frequency range:	30 MHz – 1 GHz
Characteristic measurement Instruments:	Detectors: Peak detector in compliance with art. 5 of BDS EN 55016-1-1:2010+A1:2011+A2:2015 Quasi-peak detector in compliance with art. 4 of BDS EN 55016-1-1:2010+A1:2011+A2:2015
Result:	During the test no deviation from the limit has been registered
Deviation from the method:	Corded equipment under test
Notes:	

11.1.1 Used test equipment:

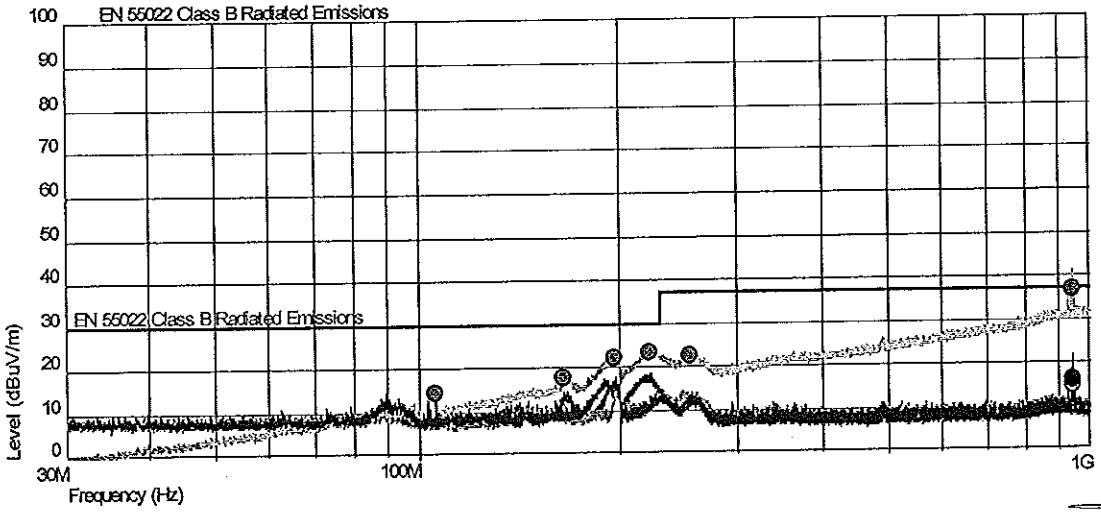
Type	Model	Manufacturer	S/N	Certificate for calibration
Measuring receiver	**ESCI**	Rohde&Schwarz	100217	0266-D-K-15195-01-00/2015-08 19.08.2015/Rohde&Schwarz
GTEM cell	**GTEM 1500**	SCHAFFNER ELECTROTEST GmbH	22224	
CDN	**CIC 8101-DCN**	Fischer Custom Communication	77	

11.1.2 Used software:

Manufacturer	Name	Version	Year/Build
Schaffner AG	GTEM 3 Emission	3.70.2	3.70.2.127

RESULTS

Radiated emission disturbances in frequency range 30 MHz – 1 GHz



Final Scan Correlated Data

Frequency (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detector	RBW (Hz)	Comment
105.96 M	14.42	0.00	14.42	PEAK CISPR	120.0 k	
164.6 M	17.53	0.00	17.53	PEAK CISPR	120.0 k	
195.68 M	22.23	0.00	22.23	PEAK CISPR	120.0 k	
220.76 M	23.20	0.00	23.20	PEAK CISPR	120.0 k	
254.88 M	22.62	0.00	22.62	PEAK CISPR	120.0 k	
944.4 M	36.99	37.00	-0.01	QP	120.0 k	*

*Registered disturbances are cased from external source

USER TESTS: GTEM Tests Without Positioner using ESCI:
EN 55022 Class B Radiated Emissions Using Receiver

Start Frequency: 30.0 MHz
Stop Frequency: 1.0 GHz

Max Number Peaks: 6
Peak Filter: 0
Peak Analysis Method: Frequency Divided

Test Type
Continuous then Step

Variable
Frequency Tuning
None
Spot Display
All Spots
Auto Peak Management
Automatically Create Peaks
Select Planes To Test
X+Y+Z
Merge Planes At End
Yes
Show Raw Data
Yes
Stream 1
Number of Segments: 1
Segment 1
Start Frequency: 30.0 MHz
Stop Frequency: 1.0 GHz
Detector Group 1
Detector: PEAK CISPR
Attenuation: Auto
PreAmp: On
RBW: 120.0 kHz
Step Size: 60.0 kHz
Dwell Time: 20ms
Reference Level: -777dB
Detector Group 2
Detector: QP
Attenuation: Auto
PreAmp: On
RBW: 120.0 kHz
Step Size: 60.0 kHz
Dwell Time: 1000ms
Reference Level: -777dB
Active Setup
Use Device on Active Path: ESCI Reciever
Equipment Configuration
User Configurations:GTEM Emissions:
R&S ESCI without Positioner
Limit Lines
User Limit Lines:GTEM Limits:
EN 55022 Class B Radiated Emissions
Attached detectors: All Detectors

11.2 Radiated radio-frequency electromagnetic field immunity test

Standard:	BDS EN 50470-1:2006 – art. 7.4.6 a), art. 7.4.6 b)			
Method:	BDS EN 61000-4-3:2006+A1:2008+A2:2010			
Performance criteria:	Criteria for performance characteristics evaluation in accordance with art. 7.4.6 of BDS EN 50470-1:2006			
Characteristic of the disturbances:	art. 7.4.6 a) I = 5 A , U_{nom} =230 V art. 7.4.6 b) I = 0 A open circuit			
Frequency range:	80 MHz – 1 GHz	1 GHz – 2 GHz	80 MHz – 1 GHz	1 GHz – 2 GHz
Field strength:	10 V/m	10 V/m	30 V/m	30 V/m
Antenna distance:	3 m	1 m	1 m	1 m
Application method:	Partial illumination	Independent "windows" method	Partial illumination	Independent "windows" method
Modulation:	80 % AM			
Frequency of modulation:	1 kHz			
Antenna polarization:	Horizontal and vertical			
EUT position in relation to antenna:	Front, back, left, right			
Frequency step:	1 % of the preceding frequency value			
Dwell time:	3 s			
Result:	During the tests no denials have been registered			
Deviation from the method:	**30 V/m** - distance between antenna and EUT in frequency range 80 MHz – 2 GHz - 1 m **10 V/m** - distance between antenna and EUT in frequency range 1 GHz – 2 GHz - 1 m			
Notes:	1. Testing results are given in Application I of test report 2. During the disturbances at level 10 V/m in horizontal and vertical polarization for each testing surface of EUT the deviation of the error is given in table 1 and table 2			

Table 1

Frequency range 80 MHz – 1 GHz								
Polarization:	Vertical				Horizontal			
Tested surface of EUT:	Left	Right	Front	Back	Left	Right	Front	Back
Recorded deviation (Max) [%]:	0.34	0.26	0.25	0.24	0.29	0.21	0.34	0.4

Table 2

Frequency range 1 GHz – 2 GHz								
Polarization:	Vertical				Horizontal			
Tested surface of EUT:	Left	Right	Front	Back	Left	Right	Front	Back
Recorded deviation (Max) [%]:	0.18	0.22	0.21	0.26	0.26	0.28	0.23	0.16

11.2.1 Used test equipment

Type	Model	Manufacturer	S/N	Certificate for calibration
Compact hybrid cell	CHC	Frankonia GmbH		EH-H16/09 / 25.05.2009 Austrian Research Centers
Power amplifier	I-SMX-500	Frankonia GmbH	M865-02-09	
Power amplifier	FLG-50A	Frankonia GmbH	1135	
Power amplifier	FLG-50F	Frankonia GmbH	1001	
RF switch	RSU 0243	Frankonia GmbH	113B1214	
Directional coupler	C5725-714	Werlatone Inc.	81038	30C00023/25.03.2009 HERBERG Service Plus GmbH
Directional coupler	CPH273E	ATM	K029201-01	30C00022/26.03.2009 HERBERG Service Plus GmbH
Directional coupler	CPH274E	ATM	K029101Z-01	30C00024/30.03.2009 HERBERG Service Plus GmbH
Signal generator	SMB-101A	Rohde&Schwarz	102022	0217-DKD-K-16101/24.02.2009 Rohde&Schwarz
Power meter	NRVD	Rohde&Schwarz	102142	30C00021/24.03.2009 HERBERG Service Plus GmbH
Power sensor	NRV-Z5	Rohde&Schwarz	100556	30C00020/25.03.2009 HERBERG Service Plus GmbH
Power sensor	NRV-Z5	Rohde&Schwarz	100557	30C00019/25.03.2009 HERBERG Service Plus GmbH
Antenna	STLP9128D	SCHWARZBECK	9128 D-022	
Antenna	BBHA 9120E	SCHWARZBECK	341	
CDN	CMAD 20	TESEQ GmbH	27725	
Working standard	MT310 Part No 1001109202	ZERA GmbH	050001515	04761-08 / 23.09.2008 ZERA GmbH
Visual EUT monitoring system				
Camera	FMC	Frankonia GmbH	090586	
Controller		Frankonia GmbH	090585	

11.2.2. Used software

Manufacturer	Name	Version	Year/Build
Frankonia GmbH	BCI-LAB/CR-LAB/RF-LAB	4.94	14.05.2009

11.3 Conducted radio-frequency electromagnetic field immunity test

Standard:	BDS EN 50470-1:2006 – art.7.4.8
Method:	BDS EN 61000-4-6:2009
Performance criteria:	**Criteria** for performance characteristics evaluation in accordance with art. 7.4.8 of BDS EN 50470-1:2006
Disturbance characteristics:	
Frequency range:	0,15 MHz - 80 MHz
Testing lines	Power supply lines
Application method:	CDN
Voltage level:	10 V (r.m.s.)
Modulation:	80 % AM
Modulation frequency:	1 kHz
Frequency step:	1 % of the preceding frequency value
Dwell time:	3 s
Source impedance:	150 Ω
Result:	During the test no denials have been registered
Uncertainty:	1,78 %
Deviation from the method:	None deviation from the method
Notes:	Registered maximum error during the disturbances is lower than MPE.

Frequency, MHz	ε, %	MPE %
0.130	-0.38	± 3
0.378	0.34	
0.410	-0.29	
0.758	-0.27	
0.858	0.23	
0.890	-0.21	
1.276	- 0.33	
3.791	-0.39	
71.10	- 0.33	

11.3.1 Used test equipment

Type	Model	Manufacturer	S/N	Certificate for calibration
Generator	NSG 2070	SCHAFFNER-CHASE EMC Ltd.	1000	CA6529/16.08.2012 TESEQ
CDN	CDN M5/32A	SCHAFFNER EMC SYSTEM Ltd	12D003	
Attenuator 6dB/ 50 W	ATN 6050	TESEQ AG	25377	
Working standard	MT310 Part No 1001109202	ZERA GmbH	050001515	04761-08 / 23.09.2008 ZERA GmbH

11.3.2 Used software:

Manufacturer	Name	Version	Year/Build
Schaffner Interpo System Ltd.	WIN 2070	3.02	1999

NOTES:

1. The results could be related only to the testing sample.
2. Coping of the test report forbidden without written consent of the testing laboratory.
3. Application I is indivisible parts from the test report.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Test performed by:

Assoc. Prof. I. Dochev Ph.D .....

Head of EMC Testing laboratory:

Assoc. Prof. N. Panteleev Ph.D. .....

Български институт по метрология
ИЛ за ЕМС
София

APPLICATION I

RESULTS from radiated radio-frequency electromagnetic field immunity test of
Single phase static electricity meter type DAISY IVEL 3CFC, S/N 1560000002

Field strength 10 V/m

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 12:35
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 1000.00 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 3.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_1000_10V_3m_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_1000_10V_3m_front_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 11:42
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 1000.00 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 3.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_1000_10V_3m_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_1000_10V_3m_back_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 10:31
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 1000.00 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 3.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_1000_10V_3m_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_1000_10V_3m_left_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 12:07
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 1000.00 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 3.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_1000_10V_3m_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_1000_10V_3m_right_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 16:12
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 1000.00 MHz - 2006.76 MHz
Fieldstrength : 10.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Horizontal
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : BBHA9120E Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\BBHA9120E_1000_2700_10V_1m_W3_HOR.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_10V_1m_front_hor.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 15:41
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 1000.00 MHz - 2006.76 MHz
Fieldstrength : 10.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Horizontal
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : BBHA9120E Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\BBHA9120E_1000_2700_10V_1m_W3_HOR.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_10V_1m_back_hor.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 16:03
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 1000.00 MHz - 2006.76 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: BBHA9120E	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\BBHA9120E_1000_2700_10V_1m_W3_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_10V_1m_left_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 15:33
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 1000.00 MHz - 2006.76 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: BBHA9120E	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\BBHA9120E_1000_2700_10V_1m_W3_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_10V_1m_right_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 13:00
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 1000.00 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 3.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_1000_10V_3m_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_1000_10V_3m_front_ver.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 14:07
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 80.00 MHz - 1000.00 MHz
Fieldstrength : 10.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128D Antenna distanc : 3.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128D_80_1000_10V_3m_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_1000_10V_3m_back_ver.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 07.09.15 Time : 13:28
Temperature : 24.0 °C Humidity : 39.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 80.00 MHz - 1000.00 MHz
Fieldstrength : 10.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128D Antenna distanc : 3.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128D_80_1000_10V_3m_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_1000_10V_3m_left_ver.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 07.09.15 Time : 14:41
Temperature : 24.0 °C Humidity : 39.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 80.00 MHz - 1000.00 MHz
Fieldstrength : 10.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128D Antenna distanc : 3.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128D_80_1000_10V_3m_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_1000_10V_3m_right_ver.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 16:19
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 1000.00 MHz - 2006.76 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: BBHA9120E	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\BBHA9120E_1000_2700_10V_1m_W3_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_10V_1m_front_ver.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 15:48
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 1000.00 MHz - 2006.76 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: BBHA9120E	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\BBHA9120E_1000_2700_10V_1m_W3_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_10V_1m_back_ver.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 15:56
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 1000.00 MHz - 2006.76 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: BBHA9120E	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\BBHA9120E_1000_2700_10V_1m_W3_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_10V_1m_left_ver.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 07.09.15	Time	: 15:26
Temperature	: 24.0 °C	Humidity	: 39.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status ok
Frequency range	: 1000.00 MHz - 2006.76 MHz
Fieldstrength	: 10.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: BBHA9120E	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\BBHA9120E_1000_2700_10V_1m_W3_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_10V_1m_right_ver.RFL		

Field strength 30 V/m

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 11:37
Temperature	: 23.0 °C	Humidity	: 40.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 80.00 MHz - 200.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Horizontal
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128D Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128D_80_200_30V_1m_HOR.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_200_30V_1m_front_hor.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 12:17
Temperature	: 23.0 °C	Humidity	: 40.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 200.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_200_30V_1m_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_200_30V_1m_back_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 12:08
Temperature	: 23.0 °C	Humidity	: 40.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 200.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_200_30V_1m_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_200_30V_1m_left_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 10.09.15 Time : 12:51
Temperature : 23.0 °C Humidity : 40.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 80.00 MHz - 200.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Horizontal
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128D Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128D_80_200_30V_1m_HOR.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_200_30V_1m_right_hor.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 10.09.15 Time : 09:41
Temperature : 24.0 °C Humidity : 36.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 200.00 MHz - 1000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Horizontal
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128 Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128_200_1000_30V_1m_W3_HOR.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_200_1000_30V_1m_front_hor.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 08:34
Temperature	: 24.0 °C	Humidity	: 36.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 200.00 MHz - 1000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Horizontal
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128 Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128_200_1000_30V_1m_W3_HOR.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_200_1000_30V_1m_back_hor.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 09:23
Temperature	: 24.0 °C	Humidity	: 36.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 200.00 MHz - 1000.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128_200_1000_30V_1m_W3_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_200_1000_30V_1m_left_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 09.09.15	Time	: 15:45
Temperature	: 24.0 °C	Humidity	: 36.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 200.00 MHz - 1000.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128_200_1000_30V_1m_W3_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_200_1000_30V_1m_right_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 09.09.15	Time	: 14:12
Temperature	: 26.0 °C	Humidity	: 37.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 1000.00 MHz - 2000.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: CBA_9429		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: BBHA9120E	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\BBHA9120E_CBA9429_1000_2000_30V_1mHP_W3_HOR.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_30V_1m_front_hor.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 09.09.15 Time : 14:44
Temperature : 26.0 °C Humidity : 37.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 1000.00 MHz - 2000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Horizontal
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : CBA_9429
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : BBHA9120E Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\BBHA9120E_CBA9429_1000_2000_30V_1mHP_W3_HOR.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_30V_1m_back_hor.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 09.09.15 Time : 14:19
Temperature : 26.0 °C Humidity : 37.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 1000.00 MHz - 2000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Horizontal
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : CBA_9429
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : BBHA9120E Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\BBHA9120E_CBA9429_1000_2000_30V_1mHP_W3_HOR.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_30V_1m_left_hor.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 09.09.15	Time	: 14:52
Temperature	: 26.0 °C	Humidity	: 37.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 1000.00 MHz - 2000.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Horizontal
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: CBA_9429		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: BBHA9120E	Antenna distanc	: 1.00 m

Reference file : c:\CR-LAB\Reference\Ref_B\BBHA9120E_CBA9429_1000_2000_30V_1mHP_W3_HOR.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_30V_1m_right_hor.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 11:48
Temperature	: 23.0 °C	Humidity	: 40.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 200.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_200_30V_1m_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_200_30V_1m_front_ver.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 12:26
Temperature	: 23.0 °C	Humidity	: 40.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 200.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_200_30V_1m_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_200_30V_1m_back_ver.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 10.09.15 Time : 11:58
Temperature : 23.0 °C Humidity : 40.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 80.00 MHz - 200.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128D Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128D_80_200_30V_1m_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_200_30V_1m_left_ver.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 12:36
Temperature	: 23.0 °C	Humidity	: 40.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 80.00 MHz - 200.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128D	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128D_80_200_30V_1m_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_80_200_30V_1m_right_ver.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 09:57
Temperature	: 24.0 °C	Humidity	: 36.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 200.00 MHz - 1000.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128_200_1000_30V_1m_W3_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_200_1000_30V_1m_front_ver.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date	: 10.09.15	Time	: 08:50
Temperature	: 24.0 °C	Humidity	: 36.0 % r.F.

Operator	: Ivo Dochev
EUT	: Daisy IVEL 3CFC
Manufacturer	: Daisy Technology Ltd.
Test conditions	:
Comment	: s/n 1560000002
	: Status OK
Frequency range	: 200.00 MHz - 1000.00 MHz
Fieldstrength	: 30.00 V/m
Step size	: 1.0 %
Dwell time	: 3.00 s
Area	: Absorbing chamber
Polarization	: Vertical
Modulation	: 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator	: R&S SMB 100A		
HF-Amplifier 1	: IFI SMX500		
HF-Amplifier 2	: FLG-50A		
HF-Amplifier 3	: FLG-50F		
Switching modul	: Frankonia RSU V2.0		
Power meter 1	: R&S NRVD		
Power meter 1	: R&S NRVD		
DC 1	: C5725-714	Attenuation	: c:\CR-LAB\C5725.RKK
DC 2	: CHP-273E	Attenuation	: c:\CR-LAB\CHP-273E.RKK
DC 3	: CHP-274F	Attenuation	: c:\CR-LAB\CHP-274F.RKK
Field sensor	: ETS HI-6005	Correction file	: c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1	: STLP9128	Antenna distanc	: 1.00 m
Reference file	: c:\CR-LAB\Reference\Ref_B\STLP9128_200_1000_30V_1m_W3_VER.R3F		
File name	: c:\CR-LAB\Results\Daisy_IVEL_3CFC_200_1000_30V_1m_back_ver.RFL		

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 10.09.15 Time : 09:06
Temperature : 24.0 °C Humidity : 36.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 200.00 MHz - 1000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128 Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128_200_1000_30V_1m_W3_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_200_1000_30V_1m_left_ver.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 09.09.15 Time : 15:30
Temperature : 24.0 °C Humidity : 36.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 200.00 MHz - 1000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : FLG-50A
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : STLP9128 Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\STLP9128_200_1000_30V_1m_W3_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_200_1000_30V_1m_right_ver.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 09.09.15 Time : 14:04
Temperature : 26.0 °C Humidity : 37.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 1000.00 MHz - 2000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : CBA_9429
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : BBHA9120E Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\BBHA9120E_CBA9429_1000_2000_30V_1mHP_W3_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_30V_1m_front_ver.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 09.09.15 Time : 14:36
Temperature : 26.0 °C Humidity : 37.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 1000.00 MHz - 2000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : CBA_9429
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : BBHA9120E Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\BBHA9120E_CBA9429_1000_2000_30V_1mHP_W3_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_30V_1m_back_ver.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 09.09.15 Time : 14:27
Temperature : 26.0 °C Humidity : 37.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 1000.00 MHz - 2000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : CBA_9429
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
Power meter 1 : R&S NRVD
DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : BBHA9120E Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\BBHA9120E_CBA9429_1000_2000_30V_1mHP_W3_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_30V_1m_left_ver.RFL

BULGARIAN INSTITUTE OF METROLOGY
EMC-Test according to IEC EN61000-4-3

Date : 09.09.15 Time : 15:00
Temperature : 26.0 °C Humidity : 37.0 % r.F.

Operator : Ivo Dochev

EUT : Daisy IVEL 3CFC
Manufacturer : Daisy Technology Ltd.
Test conditions :
Comment : s/n 1560000002
: Status OK

Frequency range : 1000.00 MHz - 2000.00 MHz
Fieldstrength : 30.00 V/m
Step size : 1.0 %
Dwell time : 3.00 s
Area : Absorbing chamber
Polarization : Vertical
Modulation : 80.000 % AM (1000.000 Hz)

Test equipment

HF-Generator : R&S SMB 100A
HF-Amplifier 1 : IFI SMX500
HF-Amplifier 2 : CBA_9429
HF-Amplifier 3 : FLG-50F
Switching modul : Frankonia RSU V2.0
Power meter 1 : R&S NRVD
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DC 1 : C5725-714 Attenuation : c:\CR-LAB\C5725.RKK
DC 2 : CHP-273E Attenuation : c:\CR-LAB\CHP-273E.RKK
DC 3 : CHP-274F Attenuation : c:\CR-LAB\CHP-274F.RKK
Field sensor : ETS HI-6005 Correction file : c:\CR-LAB\HI_6005_20V_2015.KOR
Antenna 1 : BBHA9120E Antenna distanc : 1.00 m
Reference file : c:\CR-LAB\Reference\Ref_B\BBHA9120E_CBA9429_1000_2000_30V_1mHP_W3_VER.R3F
File name : c:\CR-LAB\Results\Daisy_IVEL_3CFC_1000_2000_30V_1m_right_ver.RFL

Zkoušky elektromagnetické kompatibility
Tests of Electromagnetic Compatibility

ČMI TESTCOM Praha: Protokol o zkoušce č. 8551-PT-E0268-15 (1 + 22 listů)

ČMI Testcom Praha: Test Report No. 8551-PT-E0268-15 (1 + 22 pages)

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L 1341

Testing laboratory No. 1341 accredited by the Czech Accreditation Institute according to ISO/IEC 17025:2005

Laboratory: TESTCOM Praha, Hvožďanská 3, Praha 4, 148 01
Laboratories department, phone: +420 271 192 125, e-mail:

TEST REPORT

8551-PT-E0268-15

Copy No. 1 of 2

Date of issue:	31.12.2015
Customer:	ČMI Brno, Dep. 6011/0511 Okružní 31, 638 00 Brno, Czech Republic
Manufacturer:	DAISY Technology; ul. Tintyava 15-17; 1113 Sofia Bulgaria
Subject of the test:	**Electromagnetic compatibility**
Kind of equipment:	Single-Phase Electricity Meter for Direct Connection
Type:	IVEL 3CFC
Serial number:	1591000003
Test procedure (used standard):	ČSN EN 50 470-1, chap. 7.4.12 IEC 61000-4-19, Annex C; TNI CLC/TR 50579

The results of the tests have been obtained following the procedures reported in this Report and are related to the tested item, date, place and conditions of the test only. Test Report does not substitute any other document that may be required by national authorities according to relevant regulations.
Measurement equipment, date and place of test, ambient and test conditions, results of testing and statements of compliance and other relevant information are written in the Annex 1 of this Test Report.
Any comparison of measured values with the required ones as well as any other assessment is outside the terms of accreditation pursuing the CSN EN ISO/IEC 17025:2005 standard. Uncertainty of measurement (according to EA-4/16, k=2): The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Tested by:

Martin Poříz

Český metrologický institut

Head of the Department:

Marek Svoboda, Ph.D.

End of test report

Contents

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TESTCOM Praha
Hvožďanská 3
148 00 Praha 4

General information

Kind of equipment:	Single-Phase Electricity Meter for Direct Connection
Type designation:	IVEL 3CFC
Serial number:	1591000003
Manufacturer:	DAISY Technology; ul. Tintyava 15-17; 1113 Sofia Bulgaria
Customer:	ČMI Brno, Dep. 6011/0511 Okružní 31, 638 00 Brno, Czech Republic
Test procedure (used standard):	ČSN EN 50470-1, chap. 7.4.12; IEC 61000-4-19, Annex C; TNI CLC/TR 50579
Sample received:	22.12.2015

General EUT information

Description of EUT

[ ] table top equipment	[ ] floor standing equipment	[X] other
Mains voltage:	230 V	
Clock frequencies (MHz):	not specified	

Common description:

- Single-phase electricity meter, intended for measuring of active energy in a single phase two-wire network. It is a two tariffs meter intended for a direct connection.

- Two tariffs	
- Nominal voltage:	230 V
- Reference frequency:	50 Hz
- Reference current:	5 A
- Maximum current	80 A
- Minimum current	0.25 A
- Starting current	0.025 A
- Indicated energy resolution:	1 kWh (on display) 0.001 kWh (in read out registers)
- Accuracy class for active energy:	A
- Pulse output device:	optical (LCD); 10 000 imp/kWh
Communication interface:	optical (IEC/EN 62056-21)
- Other interfaces:	no other interface
- Ambient temperature:	-40°C ... +70°C
- Dimensions:	cca 17 x 11 x 6 cm

List of cables

Input / Output	Length [m]:	Shielded / Not shielded
L+N input	>3	N
L+N output	>3	N
Tariff switch	>3	N
S0	>3	N

Product documentation

No documentation provided

Test configuration

The equipment under test (EUT) was installed on the test places according to manufacturer's directions and requirements of the standard (ČSN EN 50470-1; CLC/TR 50579).

Two unshielded conductors of cross section approx. 1,5 mm^2 were connected to power input and two conductors to power output.

No cables were connected to clamps for tariff switch and for terminal S0.

The length of the power input cables was sufficient to reach the auxiliary laboratory equipment.

Optical interface (EN 62056-21) on the meter was used for reading out of the data.

LED output on the tested equipment was used for EUT performance evaluation. The pulses were detected with help of photodiode with amplifier. Pulses at LED output were counted by external counter Orbit Merret.

The energy resolution indicated on the display(1 kWh) was not sufficient for determining the error defined in the standard in acceptable time. For this purpose, the values read out via IEC/EN 62056-21 interface were used.

For reference energy measurement the standard electricity meter ZERA was used. Voltage circuit of the reference meter was connected parallel to the one of the EUT. Current circuit of the reference meter was connected in series to the one of the EUT.

The load current (5A) was created with help of an electric heater as load.

EUT required performance during immunity tests

[ ] defined by customer [X] defined in standards

- required performances are stated in respective clauses of the standard and are noted in the respective chapters further in this document.

EUT performance examination during immunity tests

[ ] defined by customer [X] defined in standards

- Visual observing
- In tests with a current in current circuits also comparison of the energy indications of the tested meter and the reference meter after each step of testing was performed.
- Counting of pulses at LED output.

Photographs of the sample

NO PHOTO

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Test specification

Emissions:

Product / product family standard:	ČSN EN 50470-1 (2007); clause 7.4.13

Related basic standards:

Radiated emission:	Not requested by the customer
Conducted emission:	Not requested by the customer
Harmonic emission	N/A
Flicker:	N/A

Immunity:

Product / product family standard:	ČSN EN 50470-1 (2007); clause 7.4.12; TNI CLC/TR 50579

Related basic standards:

Electrostatic discharge	Not requested by the customer
Radiated radio-frequency electromagnetic field	Not requested by the customer
Electrical fast transients / bursts	Not requested by the customer
Surges	Not requested by the customer
Conducted disturbances induced by radio-frequency fields	Not requested by the customer
Power frequency magnetic fields	ČSN EN 61000-4-8 ed.3 (2009)
Pulse magnetic fields	N/A
Voltage dips, short interruptions and voltage variations	Not requested by the customer
Oscillatory waves	N/A
Differential mode disturbances and signalling in the frequency range 2 kHz to 150 kHz.	TNI CLC/TR 50579

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14[illegible]

Summary of EMC Tests

Used standards	Class / Level	Result	Remark
Conducted emissions:			
ČSN EN 50470-1(2007), clause 7.4.13 ČSN EN 55022 ed.2:2007+A1:2008	Class B	Not performed	Not requested by the customer
Radiated emissions:			
ČSN EN 50470-1(2007), clause 7.4.13 ČSN EN 55022 ed.2:2007+A1:2008	Class B	Not performed	Not requested by the customer
Electrostatic discharge:			
ČSN EN 50470-1(2007), clause 7.4.5 ČSN EN 61000-4-2(1997) +A2(1999)+Z1(2001)	-/ 4	Not performed	Not requested by the customer
Radiated radio-frequency electromagnetic field			
ČSN EN 50470-1(2007), clause 7.4.6 ČSN EN 61000-4-3 ed.2 (2003) + A1(2003) + Z1(2003) + Z2(2003)	- / 3, 4	Not performed	Not requested by the customer
Electrical fast transients / bursts			
ČSN EN 50470-1(2007), clause 7.4.7 ČSN EN 61000-4-4 ed.2 (2005) + A1(2005) + Opr. 1(2005) + Opr. 2(2005)	-/ 4	Not performed	Not requested by the customer
Surges			
ČSN EN 50470-1(2007), clause 7.4.9 ČSN EN 61000-4-5 (1997) + Z2(1997) + Z1(1997)	-/ 4	Not performed	Not requested by the customer
Conducted disturbances induced by radio-frequency fields			
ČSN EN 50470-1(2007), clause 7.4.8 ČSN EN 61000-4-6 ed.2 (2008) + Z1(2009) + Z2(2010)	-/ 3	Not performed	Not requested by the customer
Power frequency magnetic fields			
ČSN EN 50470-1(2007), clause 7.4.12 ČSN EN 61000-4-8 ed.3 (2009)	-/ X	**PASSED**	
Short dropouts and voltage variations			
ČSN EN 50470-1(2007), clause 7.4.4 ČSN EN 61000-4-11 (1997) + Z1 (2001) + Z2 (2005)	-	Not performed	Not requested by the customer
Differential mode disturbances and signalling in the frequency range 2 kHz to 150 kHz			
TNI CLC/TR 50579, ČSN EN 50470-1, ČSN EN 50470-3;	-	**PASSED**	

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Uncertainties of measurement according to EA - 4/16

Standard	Quantity	Uncertainty	Remark
ČSN EN 55022	Radiated emissions field strength level (logper. antenna).	3,9 dB	1)
ČSN EN 55022	Conducted emission voltage level with ESH-Z2	2,3 dB	
ČSN EN 61000-3-2 ed. 3	RMS value of the harmonic current	19 %	
ČSN EN 61000-3-3	Relative voltage change value „d"	19 %	
ČSN EN 61000-4-2 (calibration uncertainty of the generator NSG 435)	Rise time	3,8%	
	Peak current	2,3%	
	Current at t = 30 ns	2,7%	
	Current at t = 30 ns	3,7%	
ČSN EN 61000-4-3	Field strength level setting	2,8 dB	
ČSN EN 61000-4-4 (calibration uncertainty of the generator NSG 625)	Impulse peak voltage (0.5 kV)	0,08 kV	
	Impulse peak voltage (1.0 kV)	0,28 kV	
	Pulse rise time	0,2 ns	
	Pulse width time	4 ns	
	Pulse repetition frequency	2 mHz	
ČSN EN 61000-4-5 (calibration uncertainty of the generator NSG 623)	Impulse peak value (voltage pulse)	5%	
	Impulse peak value (current pulse)	7%	
	Time T_1 (voltage pulse)	0,25 µs	
	Time T_1 (current pulse)	0,7 µs	
	Time T_2 (voltage pulse)	2,5 µs	
	Time T_2 (current pulse)	0,2 µs	
	Phase related to mains voltage	2°	
ČSN EN 61000-4-6	Generator level setting	1,8 dB	
ČSN EN 61000-4-11 (calibration uncertainty of the generator NSG 603)	Phase related to mains voltage	1°	
	Duration of the failure	6 µs	
	Repetition period of the failures	0,1 ms	
ČSN EN 61000-4-12 (calibration uncertainty of the generator OCS500 S4)	Impulse peak value (voltage pulse)	9%	
	Pulse rise time	22 ns	
	P_{k5}/P_{k1} ratio	5%	
	Oscillation frequency	2 kHz	
	Generator internal impedance	20 Ω	
	Pulse repetition frequency (100 kHz / 1 MHz)	2 mHz / 20 mHz	
CLC/TR 50579	Test level setting	4%	

1) Valid for ČMI TESTCOM laboratory measurement
2) In 15 points of the uniform field plane.

Uncertainty of the quantities being observed during the testing on the EUT:

Energy indication resolution on EUT display:	1 kWh.
Energy indication resolution on EN 62056-21 readout:	0,001 kWh.
Energy resolution on the LED output:	0,000 1 kWh.

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Electromagnetic compatibility laboratory

EMC Test Report – ANNEX 1
Ref. No. 8551-PT-E0268-15

Power frequency magnetic fields
ČSN EN 50470-1:2007, clause 7.4.12
ČSN EN 61000-4-8 ed.3:2009

Date of test: 22.12.2015
Ambient temperature: 20 °C ± 3 °C
Relative humidity: 35% ± 15%
Tested by: M. Porlz

Point of application	Magnetic field intensity (A/m)	Direction of application	Performance criterion	Result
EUT surface	400	3 mutually perpendicular axis	B	P

Result: P Pass F Fail

Remark: Performance criteria:

B: During the test, the performance of the equipment shall not be perturbed and the additional percentage error shall not exceed the critical change values specified in the relevant standard (ČSN EN 50470-3, Tab. 9: ± 3.0%).

Testing and measuring equipment:	Datab. No.
Generator Schaffner NSG 600 (Mainframe), s/n 3059	C117
Plug-In Unit Schaffner NSG 603, s/n 340	C118
Adjustable transformer RA20, s/n 1928	C126
Transformer MC26100/RFTVS Speziell BV 0114-97, s/n C97729	C078
Square coil 1m	
Standard watt-hour meter ZERA TPZ 306, s/n 95/576/26	Property of CMI OI Praha
Universal counter Orbit-Merret OM602UQC, s/n 1110223006	C145
Reading head (EN 62056-21 to RS232 converter)	

EUT mode of operation:

- voltage and auxiliary circuits energized with reference voltage ±5%;
- current approx. 5 A in the current circuits;
- power factor approx. 1.0

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Power frequency magnetic fields
ČSN EN 50470-1:2007, clause 7.4.12
ČSN EN 61000-4-8 ed.3:2009

Measured data

Direction	A_R (kWh)	A_I (kWh)	N_{LED} (1)	A_{NLED} (kWh)	ΔA (kWh)	$U(\Delta A)$ (kWh)	δ_{AN} (%)	δ_{ad} (%)	Remark
	0,100723	0,099	1000	0,1000	-0,00072	0,0001 2	-0,7	REF	No disturb.
A	0,100632	0,099	1003	0,1003	-0,00033	0,0001 2	-0,3	0,4	
B	0,100895	0,101	1011	0,1011	0,00020	0,0001 2	0,2	0,9	
C	0,102910	0,102	1026	0,1026	-0,00031	0,0001 2	-0,3	0,4	
	0,100725	0,099	999	0,0999	-0,00082	0,0001 2	-0,8	-0,1	No disturb.

No unaccepted response to applied disturbance occurred during testing at EUT.

Remarks:

Used symbols:

A_R ... Reference energy
A_I ... EUT indicated energy
N_{LED} ... Number of pulses at EUT LED pulse output
A_{NLED} EUT energy derived from N_{LED}
ΔA ... Difference between A_{NLED} and A_R
$U(\Delta A)$ ... Expanded uncertainty of ΔA
δ_{AI} ... Relative error of the A_I
δ_{ad} ... Additional percentage error due to an influence quantity

Direction of disturbance application:
A... H vector in the direction of the axis of the meter going from top to bottom
B... H vector in the direction of the axis of the meter going from front to rear.
C... H vector in the direction of the axis of the meter going from left to right.

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EMC Test Report – ANNEX 1
Ref. No. 8551-PT-E0268-15

Power frequency magnetic fields
ČSN EN 50470-1:2007, clause 7.4.12
ČSN EN 61000-4-8 ed.3:2009

Test set-up:

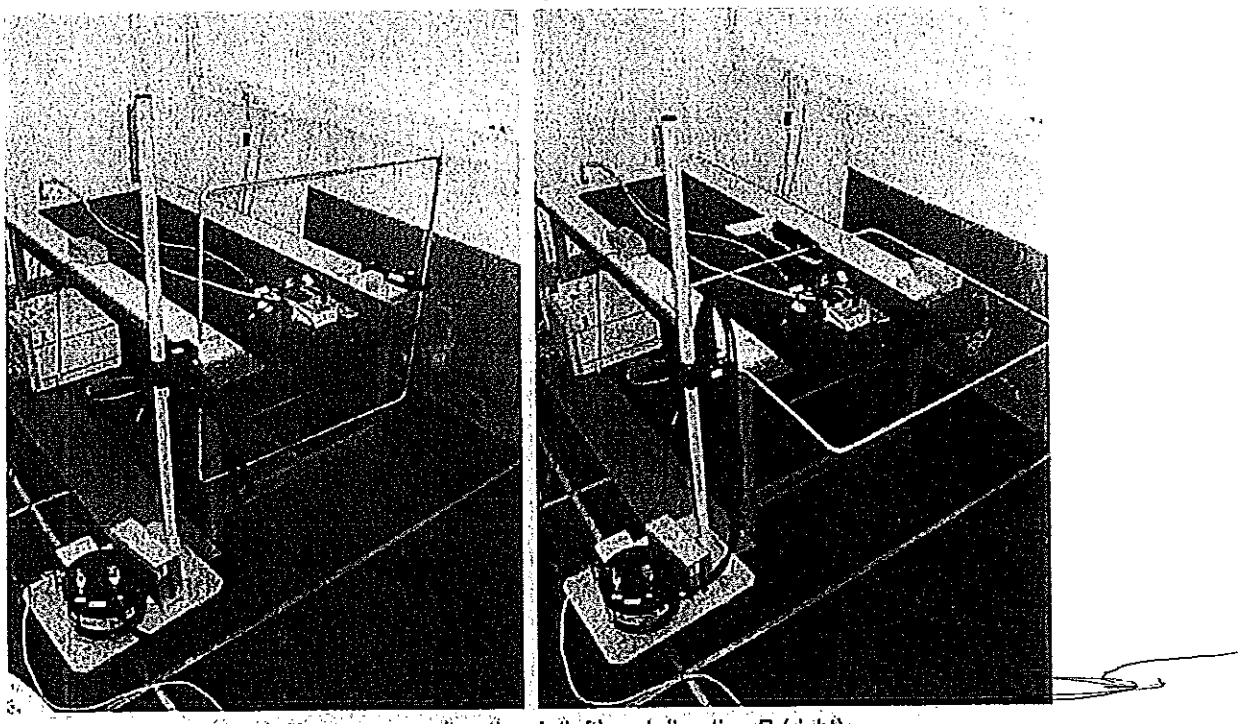

Fig. 1: Test set-up – direction A (left) and direction B (right).

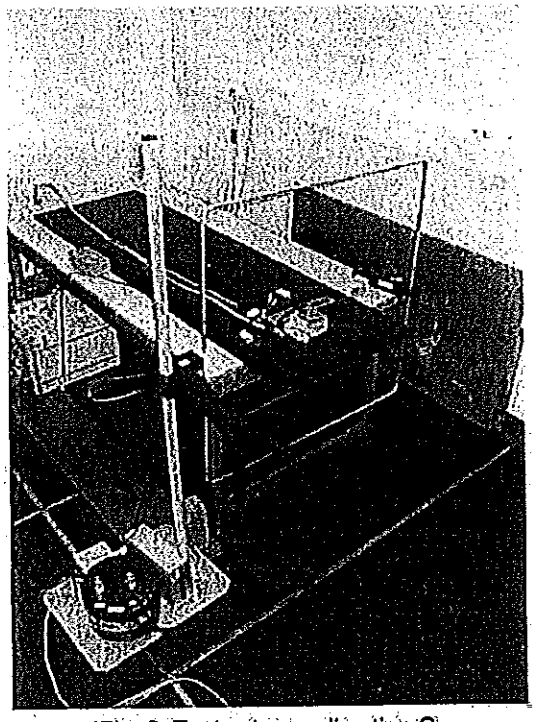

Fig. 2: Test set-up – direction C.

Differential mode disturbances and signalling in the frequency range 2 kHz to 150 kHz TNI CLC/TR 50579:2014

Date of test: 22.12.2015
Ambient temperature: 20 °C ± 3 °C
Relative humidity: 35% ± 15%
Tested by: M. Porlz

Application	Test Level	Frequency range (kHz)	Modulation frequency (Hz)	Required criterion	Result
Current circuit, phase 1	2 A	2 – 30	without modulation	A	P
Current circuit, phase 1	1 A	30 - 150	without modulation	A	P

Result: P Pass F Fail N Not performed

Annotation: Evaluating criterions used :

A: During the test, the performance of the equipment shall not be perturbed and the additional percentage error shall not exceed the critical change values specified in the relevant standard (ČSN EN 50470-3, Tab. 9: ± 3.0%).

According to CLC/TR 50579:2012 the value of the maximum allowed additional percentage error for electricity meters of class A is 6%.

Testing and measuring equipment:	Datab. No.
Generator Tabor Electronics TA 8026	A 009
Generator / Amplifier Frankonia PSG 300, s/n 124A1202/2011	C168
Digital multimeter Agilent 34461A, s/n MY53204156	C175
Reference electricity meter LMG 450	B019
Variable transformer RFT LTS006, s/n 310329	A076
Counter Orbit Merret OM602UQC, s/n 1110223006	C145
Current probe RAO CT 2.100A/V, s/n 003	C176
Power shunt resistor 1 Ω Frankonia	C177

EUT mode of operation:

- voltage circuit energized with reference voltage ±5%;
- load current (50 Hz) approx. 5 A in the current circuit.
- measurement performed on the phase 1 only as a representative phase.

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EMC Test Report – ANNEX 1
Ref. No. 8551-PT-E0268-15

Differential mode disturbances and signalling in the frequency range 2 kHz to 150 kHz TNI CLC/TR 50579:201

Measured values

f_o (kHz)	I_o (A)	P_{ref} (W)	T_{imp} (s)	P_t (W)	δ_{Pt} (%)	δ_{ad} (%)	Remark
2.000000	–	1157.4	0.317995	1132.1	-2.2	REF	Without disturbance
2.000000	1	1157.0	0.318051	1131.9	-2.2	0.0	
2.000000	1	1157.2	0.318099	1131.7	-2.2	0.0	
2.020000	1	1157.3	0.317976	1132.2	-2.2	0.0	
2.040200	1	1157.3	0.317943	1132.3	-2.2	0.0	
2.060602	1	1157.4	0.317961	1132.2	-2.2	0.0	
2.081208	1	1154.2	0.318096	1131.7	-1.9	0.2	
2.102020	1	1154.9	0.318029	1132.0	-2.0	0.2	
2.123040	1	1155.3	0.318188	1131.4	-2.1	0.1	
2.144271	1	1155.7	0.318261	1131.1	-2.1	0.1	
2.165713	1	1155.8	0.318166	1131.5	-2.1	0.1	
2.187370	1	1157.5	0.318059	1131.9	-2.2	0.0	
2.209244	1	1159.2	0.317754	1133.0	-2.3	-0.1	
2.231337	1	1159.3	0.317671	1133.2	-2.2	-0.1	
2.253650	1	1158.8	0.317512	1133.8	-2.2	0.0	
2.276186	1	1158.8	0.317565	1133.6	-2.2	0.0	
2.298948	1	1158.6	0.317437	1134.1	-2.1	0.1	
2.321938	1	1159.1	0.317533	1133.7	-2.2	0.0	
2.345157	1	1158.5	0.317475	1133.9	-2.1	0.1	
2.368609	1	1158.2	0.317559	1133.6	-2.1	0.1	
2.392295	1	1158.3	0.317542	1133.7	-2.1	0.1	
2.416218	1	1158.5	0.317612	1133.5	-2.2	0.0	
2.440380	1	1158.6	0.317553	1133.7	-2.2	0.0	
2.464783	1	1157.9	0.317706	1133.1	-2.1	0.0	
2.489431	1	1157.7	0.317630	1133.4	-2.1	0.1	
2.514326	1	1158.2	0.317768	1132.9	-2.2	0.0	
2.539469	1	1157.6	0.317723	1133.1	-2.1	0.1	
2.564863	1	1158.4	0.317698	1133.2	-2.2	0.0	
2.590512	1	1158.6	0.317574	1133.6	-2.2	0.0	
2.616417	1	1158.2	0.317467	1134.0	-2.1	0.1	
2.642581	1	1158.4	0.317594	1133.5	-2.1	0.0	
2.669007	1	1157.9	0.317598	1133.5	-2.1	0.1	
2.695697	1	1157.9	0.317564	1133.6	-2.1	0.1	
2.722654	1	1157.1	0.317595	1133.5	-2.0	0.1	
2.749881	1	1156.3	0.317636	1133.4	-2.0	0.2	
2.777379	1	1156.9	0.317687	1133.2	-2.0	0.1	
2.805153	1	1156.7	0.317708	1133.1	-2.0	0.1	
2.833205	1	1160.1	0.317700	1133.1	-2.3	-0.1	
2.861537	1	1162.5	0.317426	1134.1	-2.4	-0.3	
2.890152	1	1162.4	0.316383	1137.9	-2.1	0.1	
2.919053	1	1162.2	0.316309	1138.1	-2.1	0.1	
2.948244	1	1161.8	0.316391	1137.8	-2.1	0.1	
2.977726	1	1161.0	0.316512	1137.4	-2.0	0.2	
3.007504	1	1159.7	0.316629	1137.0	-2.0	0.2	
3.037579	1	1158.5	0.316892	1136.0	-1.9	0.2	
3.067954	1	1157.8	0.317236	1134.8	-2.0	0.2	
3.098634	1	1157.3	0.317530	1133.8	-2.0	0.2	
3.129620	1	1157.1	0.317680	1133.2	-2.1	0.1	
3.160916	1	1157.1	0.317811	1132.7	-2.1	0.1	
3.192526	1	1157.3	0.317727	1133.0	-2.1	0.1	
3.224451	1	1157.2	0.317855	1132.6	-2.1	0.1	
3.256695	1	1157.3	0.317891	1132.5	-2.1	0.0	
3.289262	1	1157.2	0.317828	1132.7	-2.1	0.1	

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f_c (kHz)	I_c (A)	P_{ref} (W)	T_{imp} (s)	P_I (W)	δ_{PI} (%)	δ_{sd} (%)	Remark
3.322155	1	1157.1	0.317790	1132.8	-2.1	0.1	
3.355376	1	1156.8	0.317836	1132.7	-2.1	0.1	
3.388930	1	1156.8	0.317863	1132.6	-2.1	0.1	
3.422819	1	1156.9	0.317807	1132.8	-2.1	0.1	
3.457047	1	1158.0	0.317794	1132.8	-2.2	0.0	
3.491618	1	1157.3	0.317667	1133.3	-2.1	0.1	
3.526534	1	1157.8	0.317711	1133.1	-2.1	0.1	
3.561799	1	1157.1	0.317644	1133.3	-2.1	0.1	
3.597417	1	1157.3	0.317716	1133.1	-2.1	0.1	
3.633391	1	1157.2	0.317700	1133.1	-2.1	0.1	
3.669726	1	1157.2	0.317693	1133.2	-2.1	0.1	
3.706422	1	1156.8	0.317664	1133.3	-2.0	0.2	
3.743487	1	1157.2	0.317742	1133.0	-2.1	0.1	
3.780922	1	1157.5	0.317668	1133.3	-2.1	0.1	
3.818731	1	1157.1	0.317637	1133.4	-2.1	0.1	
3.856771	1	1157.3	0.317636	1133.4	-2.1	0.1	
3.856959	1	1157.1	0.317738	1133.0	-2.1	0.1	
3.895528	1	1157.1	0.317800	1132.8	-2.1	0.1	
3.934484	1	1157.0	0.317617	1133.4	-2.0	0.2	
3.973828	1	1156.7	0.317711	1133.1	-2.0	0.1	
4.013567	1	1156.8	0.317612	1133.5	-2.0	0.2	
4.053702	1	1157.0	0.317720	1133.1	-2.1	0.1	
4.094239	1	1157.0	0.317685	1133.2	-2.1	0.1	
4.135182	1	1157.4	0.317647	1133.3	-2.1	0.1	
4.176533	1	1156.6	0.317689	1133.2	-2.0	0.2	
4.218299	1	1156.6	0.317683	1133.2	-2.0	0.2	
4.260482	1	1156.5	0.317738	1133.0	-2.0	0.2	
4.303086	1	1156.7	0.317736	1133.0	-2.0	0.1	
4.346117	1	1156.3	0.317744	1133.0	-2.0	0.2	
4.389578	1	1157.1	0.317696	1132.4	-2.1	0.1	
4.433474	1	1157.2	0.317778	1132.9	-2.1	0.1	
4.477809	1	1156.8	0.317650	1133.3	-2.0	0.2	
4.522587	1	1157.0	0.317802	1132.8	-2.1	0.1	
4.567813	1	1157.3	0.317792	1132.8	-2.1	0.1	
4.613491	1	1156.8	0.317718	1133.1	-2.1	0.1	
4.659626	1	1156.8	0.317856	1132.6	-2.1	0.1	
4.706222	1	1157.0	0.317866	1132.6	-2.1	0.1	
4.753284	1	1157.0	0.317757	1132.9	-2.1	0.1	
4.800817	1	1156.9	0.317615	1133.4	-2.0	0.2	
4.848825	1	1156.6	0.317627	1133.4	-2.0	0.2	
4.897313	1	1156.5	0.317757	1132.9	-2.0	0.1	
4.946286	1	1157.1	0.317775	1132.9	-2.1	0.1	
4.995749	1	1156.5	0.317696	1133.2	-2.0	0.2	
5.045706	1	1156.8	0.317742	1133.0	-2.1	0.1	
5.096163	1	1156.6	0.317790	1132.8	-2.1	0.1	
5.147125	1	1157.0	0.317774	1132.9	-2.1	0.1	
5.198596	1	1156.4	0.317704	1133.1	-2.0	0.2	
5.250582	1	1157.0	0.317769	1132.9	-2.1	0.1	
5.303088	1	1157.2	0.317695	1133.2	-2.1	0.1	
5.356119	1	1157.3	0.317800	1132.8	-2.1	0.1	
5.409680	1	1156.5	0.317644	1133.3	-2.0	0.2	
5.463777	1	1156.7	0.317747	1133.0	-2.1	0.1	
5.518414	1	1157.3	0.317777	1132.9	-2.1	0.1	
5.573598	1	1157.4	0.317722	1133.1	-2.1	0.1	
5.629334	1	1156.9	0.317676	1133.2	-2.0	0.1	
5.685628	1	1157.4	0.317772	1132.9	-2.1	0.1	
5.742484	1	1158.0	0.317545	1133.7	-2.1	0.1	
5.799909	1	1157.6	0.317697	1133.2	-2.1	0.1	

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f_o (kHz)	I_d (A)	P_{ref} (W)	T_{imp} (s)	P_i (W)	δ_{ei} (%)	δ_{ad} (%)	Remark
5.857908	1	1157.5	0.317514	1133.8	-2.0	0.1	
5.916487	1	1157.5	0.317716	1133.1	-2.1	0.1	
5.975651	1	1157.4	0.317633	1133.4	-2.1	0.1	
6.035408	1	1157.5	0.317707	1133.1	-2.1	0.1	
6.095762	1	1157.5	0.317699	1133.1	-2.1	0.1	
6.156719	1	1157.8	0.317631	1133.4	-2.1	0.1	
6.218287	1	1158.0	0.317633	1133.4	-2.1	0.1	
6.280469	1	1158.0	0.317552	1133.7	-2.1	0.1	
6.343274	1	1157.5	0.317500	1133.9	-2.0	0.1	
6.406707	1	1157.7	0.317497	1133.9	-2.1	0.1	
6.470774	1	1157.9	0.317614	1133.5	-2.1	0.1	
6.535481	1	1158.0	0.317592	1133.6	-2.1	0.1	
6.600836	1	1158.2	0.317570	1133.6	-2.1	0.1	
6.666844	1	1158.2	0.317618	1133.4	-2.1	0.0	
6.733513	1	1157.7	0.317533	1133.7	-2.1	0.1	
6.800848	1	1157.7	0.317503	1133.8	-2.1	0.1	
6.868856	1	1158.7	0.317584	1133.6	-2.2	0.0	
6.937545	1	1158.7	0.317387	1134.3	-2.1	0.1	
7.006920	1	1158.8	0.317159	1135.1	-2.0	0.1	
7.076989	1	1158.4	0.317452	1134.0	-2.1	0.1	
7.147759	1	1158.5	0.317409	1134.2	-2.1	0.1	
7.219237	1	1158.0	0.317506	1133.8	-2.1	0.1	
7.291429	1	1157.9	0.317581	1133.6	-2.1	0.1	
7.364343	1	1158.0	0.317581	1133.6	-2.1	0.1	
7.437987	1	1158.4	0.317532	1133.7	-2.1	0.1	
7.512366	1	1157.9	0.317581	1133.6	-2.1	0.1	
7.587490	1	1158.6	0.317650	1133.3	-2.2	0.0	
7.663365	1	1158.6	0.317567	1133.6	-2.2	0.0	
7.739998	1	1160.7	0.317527	1133.8	-2.3	-0.1	
7.817398	1	1159.2	0.317354	1134.4	-2.1	0.0	
7.895572	1	1158.0	0.317180	1135.0	-2.0	0.2	
7.974528	1	1158.4	0.317448	1134.0	-2.1	0.1	
8.054273	1	1158.2	0.317535	1133.7	-2.1	0.1	
8.134816	1	1158.2	0.317628	1133.4	-2.1	0.0	
8.216164	1	1158.6	0.317573	1133.6	-2.2	0.0	
8.298325	1	1158.2	0.317424	1134.1	-2.1	0.1	
8.381308	1	1158.4	0.317532	1133.7	-2.1	0.1	
8.465121	1	1158.4	0.317545	1133.7	-2.1	0.1	
8.549773	1	1158.5	0.317589	1133.5	-2.2	0.0	
8.635270	1	1158.6	0.317579	1133.6	-2.2	0.0	
8.721623	1	1158.6	0.317506	1133.8	-2.2	0.0	
8.808839	1	1158.6	0.317498	1133.9	-2.1	0.1	
8.896927	1	1159.4	0.317417	1134.2	-2.2	0.0	
8.985896	1	1159.7	0.317302	1134.6	-2.2	0.0	
9.075755	1	1159.6	0.317153	1135.1	-2.1	0.1	
9.16651	1	1159.4	0.317224	1134.8	-2.1	0.1	
9.25818	1	1159.3	0.317229	1134.8	-2.1	0.1	
9.35076	1	1159.0	0.317336	1134.4	-2.1	0.1	
9.44427	1	1158.7	0.317279	1134.6	-2.1	0.1	
9.53871	1	1158.8	0.317368	1134.3	-2.1	0.1	
9.63410	1	1158.5	0.317412	1134.2	-2.1	0.1	
9.73044	1	1158.8	0.317437	1134.1	-2.1	0.1	
9.82774	1	1158.9	0.317444	1134.1	-2.1	0.0	
9.92602	1	1158.5	0.317485	1133.9	-2.1	0.1	
10.02528	1	1158.1	0.317424	1134.1	-2.1	0.1	
10.12553	1	1158.7	0.317377	1134.3	-2.1	0.1	
10.22679	1	1158.6	0.317541	1133.7	-2.1	0.0	
10.32905	1	1158.7	0.317457	1134.0	-2.1	0.1	

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f_c (kHz)	I_c (A)	P_{ref} (W)	T_{imp} (s)	P_I (W)	δ_{PI} (%)	δ_{ad} (%)	Remark
10.43235	1	1158.5	0.317444	1134.1	-2.1	0.1	
10.53667	1	1158.6	0.317419	1134.1	-2.1	0.1	
10.64204	1	1158.3	0.317319	1134.5	-2.1	0.1	
10.74846	1	1158.3	0.317364	1134.3	-2.1	0.1	
10.85594	1	1158.0	0.317411	1134.2	-2.1	0.1	
10.96450	1	1158.3	0.317558	1133.7	-2.1	0.1	
11.07414	1	1158.2	0.317435	1134.1	-2.1	0.1	
11.18489	1	1158.2	0.317415	1134.2	-2.1	0.1	
11.29673	1	1158.4	0.317417	1134.2	-2.1	0.1	
11.40970	1	1158.4	0.317494	1133.9	-2.1	0.1	
11.52380	1	1158.5	0.317426	1134.1	-2.1	0.1	
11.63904	1	1158.3	0.317561	1133.6	-2.1	0.1	
11.75543	1	1158.3	0.317420	1134.1	-2.1	0.1	
11.87298	1	1158.5	0.317458	1134.0	-2.1	0.1	
11.99171	1	1158.5	0.317466	1134.0	-2.1	0.1	
12.11163	1	1158.2	0.317353	1134.4	-2.1	0.1	
12.23274	1	1158.1	0.317465	1134.0	-2.1	0.1	
12.35507	1	1157.8	0.317440	1134.1	-2.0	0.1	
12.47862	1	1158.1	0.317406	1134.2	-2.1	0.1	
12.60341	1	1158.0	0.317501	1133.9	-2.1	0.1	
12.72944	1	1158.6	0.317519	1133.8	-2.1	0.1	
12.85674	1	1158.6	0.317476	1133.9	-2.1	0.1	
12.98530	1	1158.9	0.317303	1134.6	-2.1	0.1	
13.11516	1	1158.8	0.317285	1134.6	-2.1	0.1	
13.24631	1	1158.5	0.317366	1134.3	-2.1	0.1	
13.37877	1	1158.7	0.317401	1134.2	-2.1	0.1	
13.51256	1	1158.9	0.317386	1134.3	-2.1	0.1	
13.64768	1	1159.3	0.317348	1134.4	-2.1	0.0	
13.78416	1	1158.9	0.317273	1134.7	-2.1	0.1	
13.92200	1	1159.0	0.317314	1134.5	-2.1	0.1	
14.06122	1	1158.8	0.317270	1134.7	-2.1	0.1	
14.20183	1	1158.9	0.317310	1134.5	-2.1	0.1	
14.34385	1	1158.9	0.317365	1134.3	-2.1	0.1	
14.48729	1	1158.9	0.317318	1134.5	-2.1	0.1	
14.63216	1	1158.8	0.317188	1135.0	-2.1	0.1	
14.77848	1	1158.6	0.317418	1134.2	-2.1	0.1	
14.92627	1	1158.8	0.317406	1134.2	-2.1	0.1	
15.07553	1	1158.9	0.317339	1134.4	-2.1	0.1	
15.22629	1	1158.6	0.317337	1134.4	-2.1	0.1	
15.3785	1	1158.2	0.317407	1134.2	-2.1	0.1	
15.5323	1	1158.5	0.317481	1133.9	-2.1	0.1	
15.6877	1	1158.9	0.229091	1571.4	35.6	37.8	
15.8445	1	1159.2	0.317329	1134.5	-2.1	0.1	
16.0030	1	1159.0	0.317387	1134.3	-2.1	0.1	
16.1630	1	1158.9	0.317351	1134.4	-2.1	0.1	
16.3246	1	1159.2	0.317389	1134.3	-2.2	0.0	
16.4879	1	1158.6	0.317336	1134.4	-2.1	0.1	
16.6528	1	1158.4	0.317421	1134.1	-2.1	0.1	
16.8193	1	1158.8	0.317381	1134.3	-2.1	0.1	
16.9875	1	1158.6	0.317444	1134.1	-2.1	0.1	
17.1574	1	1158.8	0.317419	1134.1	-2.1	0.1	
17.3289	1	1158.4	0.317443	1134.1	-2.1	0.1	
17.5022	1	1158.5	0.317477	1133.9	-2.1	0.1	
17.6772	1	1158.4	0.317438	1134.1	-2.1	0.1	
17.8540	1	1158.8	0.317382	1134.3	-2.1	0.1	
18.0326	1	1158.4	0.317430	1134.1	-2.1	0.1	
18.2129	1	1159.0	0.317375	1134.3	-2.1	0.1	
18.3950	1	1159.1	0.317306	1134.6	-2.1	0.1	

f_c (kHz)	I_c (A)	P_{ref} (W)	T_{imp} (s)	P_I (W)	δ_P (%)	δ_{ad} (%)	Remark
18.5790	1	1159.3	0.317256	1134.7	-2.1	0.1	
18.7647	1	1159.2	0.317184	1135.0	-2.1	0.1	
18.9524	1	1159.5	0.317166	1135.1	-2.1	0.1	
19.1419	1	1159.2	0.317246	1134.8	-2.1	0.1	
19.3333	1	1159.1	0.317278	1134.7	-2.1	0.1	
19.5267	1	1159.4	0.317259	1134.7	-2.1	0.1	
19.7219	1	1159.4	0.317213	1134.9	-2.1	0.1	
19.9192	1	1159.3	0.317273	1134.7	-2.1	0.1	
20.1183	1	1159.7	0.317301	1134.6	-2.2	0.0	
20.3195	1	1159.7	0.317281	1134.6	-2.2	0.0	
20.5227	1	1159.4	0.317136	1135.2	-2.1	0.1	
20.7280	1	1159.0	0.317240	1134.8	-2.1	0.1	
20.9352	1	1159.3	0.317282	1134.6	-2.1	0.1	
21.1446	1	1159.0	0.317213	1134.9	-2.1	0.1	
21.3560	1	1158.8	0.317260	1134.7	-2.1	0.1	
21.5696	1	1158.8	0.317372	1134.3	-2.1	0.1	
21.7853	1	1158.8	0.317389	1134.3	-2.1	0.1	
22.0031	1	1159.0	0.317355	1134.4	-2.1	0.1	
22.2232	1	1159.0	0.317367	1134.3	-2.1	0.1	
22.4454	1	1158.4	0.317356	1134.4	-2.1	0.1	
22.6699	1	1159.1	0.317396	1134.2	-2.1	0.0	
22.8966	1	1158.9	0.317397	1134.2	-2.1	0.1	
23.1255	1	1159.1	0.317298	1134.6	-2.1	0.1	
23.3568	1	1159.0	0.317336	1134.4	-2.1	0.1	
23.5903	1	1158.9	0.317206	1134.9	-2.1	0.1	
23.8262	1	1158.8	0.317295	1134.6	-2.1	0.1	
24.0645	1	1158.8	0.317333	1134.5	-2.1	0.1	
24.3052	1	1159.2	0.317417	1134.2	-2.2	0.0	
24.5482	1	1159.2	0.317296	1134.6	-2.1	0.1	
24.7937	1	1159.1	0.317288	1134.6	-2.1	0.1	
25.0416	1	1159.1	0.317300	1134.6	-2.1	0.1	
25.2920	1	1159.2	0.317346	1134.4	-2.1	0.0	
25.5450	1	1159.5	0.317247	1134.8	-2.1	0.1	
25.8004	1	1159.0	0.317192	1135.0	-2.1	0.1	
26.0584	1	1159.0	0.317255	1134.7	-2.1	0.1	
26.3190	1	1159.0	0.317342	1134.4	-2.1	0.1	
26.5822	1	1159.5	0.317160	1135.1	-2.1	0.1	
26.8480	1	1159.2	0.317150	1135.1	-2.1	0.1	
27.1165	1	1159.7	0.317184	1135.0	-2.1	0.1	
27.3877	1	1159.2	0.317196	1134.9	-2.1	0.1	
27.6615	1	1159.8	0.317239	1134.8	-2.2	0.0	
27.9381	1	1159.1	0.317176	1135.0	-2.1	0.1	
28.2175	1	1159.2	0.317149	1135.1	-2.1	0.1	
28.4997	1	1159.1	0.317199	1134.9	-2.1	0.1	
28.7847	1	1159.5	0.317211	1134.9	-2.1	0.1	
29.0725	1	1159.8	0.317187	1135.0	-2.1	0.0	
29.3633	1	1159.1	0.317179	1135.0	-2.1	0.1	
29.6569	1	1159.4	0.317203	1134.9	-2.1	0.1	
29.9535	1	1159.4	0.317179	1135.0	-2.1	0.1	
30.2530	2	1159.6	0.317185	1135.0	-2.1	0.1	
30.5555	2	1159.6	0.317157	1135.1	-2.1	0.1	
30.8611	2	1159.8	0.317098	1135.3	-2.1	0.1	
31.1697	2	1159.6	0.317079	1135.4	-2.1	0.1	
31.4814	2	1159.7	0.317063	1135.4	-2.1	0.1	
31.7962	2	1159.9	0.317047	1135.5	-2.1	0.1	
32.1142	2	1159.6	0.317032	1135.5	-2.1	0.1	
32.4353	2	1159.4	0.317132	1135.2	-2.1	0.1	
32.7597	2	1160.2	0.317089	1135.3	-2.1	0.0	

f_o (kHz)	I_o (A)	P_{ref} (W)	T_{imp} (s)	P_i (W)	δ_{Pi} (%)	δ_{dd} (%)	Remark
33.0873	2	1160.0	0.317022	1135.6	-2.1	0.1	
33.4181	2	1160.0	0.316968	1135.8	-2.1	0.1	
33.7523	2	1159.7	0.316951	1135.8	-2.1	0.1	
34.0898	2	1158.8	0.316945	1135.8	-2.0	0.2	
34.4307	2	1158.1	0.317284	1134.6	-2.0	0.2	
34.7750	2	1158.7	0.317371	1134.3	-2.1	0.1	
35.1228	2	1159.1	0.317327	1134.5	-2.1	0.1	
35.4740	2	1159.1	0.317355	1134.4	-2.1	0.1	
35.8288	2	1158.7	0.317280	1134.6	-2.1	0.1	
36.1870	2	1158.7	0.317336	1134.4	-2.1	0.1	
36.5489	2	1158.9	0.317311	1134.5	-2.1	0.1	
36.9144	2	1159.1	0.317215	1134.9	-2.1	0.1	
37.2836	2	1159.6	0.317151	1135.1	-2.1	0.1	
37.6564	2	1158.2	0.317205	1134.9	-2.0	0.2	
38.0330	2	1158.2	0.317232	1134.8	-2.0	0.2	
38.4133	2	1158.7	0.317133	1135.2	-2.0	0.2	
38.7974	2	1158.6	0.317200	1134.9	-2.0	0.1	
39.1854	2	1158.1	0.317280	1134.6	-2.0	0.2	
39.5772	2	1158.5	0.317131	1135.2	-2.0	0.2	
39.9730	2	1158.9	0.317165	1135.1	-2.1	0.1	
40.3727	2	1158.7	0.317029	1135.5	-2.0	0.2	
40.7765	2	1159.2	0.317096	1135.3	-2.1	0.1	
41.1842	2	1158.7	0.317110	1135.3	-2.0	0.2	
41.5961	2	1158.7	0.317045	1135.5	-2.0	0.2	
42.0120	2	1158.7	0.317247	1134.8	-2.1	0.1	
42.4322	2	1163.7	0.317109	1135.3	-2.4	-0.3	
42.8565	2	1163.7	0.315947	1139.4	-2.1	0.1	
43.2850	2	1163.8	0.315694	1140.3	-2.0	0.2	
43.7179	2	1163.9	0.315608	1140.7	-2.0	0.2	
44.1551	2	1163.9	0.315729	1140.2	-2.0	0.2	
44.5966	2	1163.7	0.315756	1140.1	-2.0	0.2	
45.0426	2	1164.0	0.315763	1140.1	-2.1	0.1	
45.4930	2	1163.6	0.315755	1140.1	-2.0	0.2	
45.9479	2	1164.2	0.315686	1140.4	-2.0	0.1	
46.4074	2	1163.5	0.315600	1140.7	-2.0	0.2	
46.8715	2	1163.3	0.315632	1140.6	-2.0	0.2	
47.3402	2	1162.9	0.315679	1140.4	-1.9	0.3	
47.8136	2	1162.9	0.315785	1140.0	-2.0	0.2	
48.2917	2	1163.3	0.315925	1139.5	-2.0	0.1	
48.7747	2	1163.1	0.315911	1139.6	-2.0	0.2	
49.2624	2	1162.9	0.315806	1139.9	-2.0	0.2	
49.7550	2	1162.6	0.316881	1139.7	-2.0	0.2	
50.2526	2	1162.4	0.315926	1139.5	-2.0	0.2	
50.7551	2	1161.6	0.316004	1139.2	-1.9	0.3	
51.2627	2	1160.2	0.316161	1138.7	-1.9	0.3	
51.7753	2	1159.5	0.316580	1137.2	-1.9	0.3	
52.2930	2	1159.4	0.316940	1135.9	-2.0	0.2	
52.8160	2	1159.0	0.316930	1135.9	-2.0	0.2	
53.3441	2	1158.7	0.317006	1135.6	-2.0	0.2	
53.8776	2	1159.8	0.317043	1135.5	-2.1	0.1	
54.4163	2	1159.9	0.316850	1136.2	-2.0	0.1	
54.9605	2	1160.0	0.316765	1136.5	-2.0	0.2	
55.5101	2	1160.5	0.316670	1136.8	-2.0	0.1	
56.0652	2	1160.5	0.316583	1137.1	-2.0	0.2	
56.6259	2	1165.2	0.316662	1136.9	-2.4	-0.2	
57.1921	2	1165.5	0.315441	1141.3	-2.1	0.1	
57.7640	2	1165.9	0.315332	1141.7	-2.1	0.1	
58.3417	2	1165.3	0.315318	1141.7	-2.0	0.2	

f_c (kHz)	I_c (A)	P_{ref} (W)	T_{imp} (s)	P_i (W)	δ_{Pi} (%)	δ_{sd} (%)	Remark
58.9251	2	1164.5	0.315269	1141.9	-1.9	0.2	
59.5143	2	1161.4	0.315621	1140.6	-1.8	0.4	
60.1095	2	1161.3	0.316100	1138.9	-1.9	0.3	
60.7106	2	1161.3	0.316556	1137.2	-2.1	0.1	
61.3177	2	1161.1	0.316534	1137.3	-2.0	0.1	
61.9309	2	1160.7	0.316480	1137.5	-2.0	0.2	
62.5502	2	1160.7	0.316540	1137.3	-2.0	0.2	
63.1757	2	1160.7	0.316480	1137.5	-2.0	0.2	
63.8074	2	1160.7	0.316518	1137.4	-2.0	0.2	
64.4455	2	1160.2	0.316602	1137.1	-2.0	0.2	
65.0900	2	1160.0	0.316602	1137.1	-2.0	0.2	
65.7409	2	1160.6	0.316753	1136.5	-2.1	0.1	
66.3983	2	1160.1	0.316608	1137.1	-2.0	0.2	
66.3983	2	1159.9	0.316639	1136.9	-2.0	0.2	
67.0622	2	1159.7	0.316767	1136.5	-2.0	0.2	
67.7329	2	1159.1	0.316781	1136.4	-2.0	0.2	
68.4102	2	1158.8	0.316928	1135.9	-2.0	0.2	
69.0943	2	1158.8	0.317044	1135.5	-2.0	0.2	
69.7852	2	1159.0	0.317048	1135.5	-2.0	0.2	
70.4831	2	1159.2	0.317047	1135.5	-2.0	0.1	
71.1879	2	1158.8	0.316894	1136.0	-2.0	0.2	
71.8998	2	1158.7	0.317052	1135.5	-2.0	0.2	
72.6188	2	1158.8	0.317022	1135.6	-2.0	0.2	
73.3450	2	1158.5	0.317007	1135.6	-2.0	0.2	
74.0784	2	1158.9	0.317035	1135.5	-2.0	0.2	
74.8192	2	1158.4	0.317003	1135.6	-2.0	0.2	
75.5674	2	1158.2	0.317117	1135.2	-2.0	0.2	
76.3231	2	1158.7	0.317103	1135.3	-2.0	0.2	
77.0863	2	1158.5	0.317075	1135.4	-2.0	0.2	
77.8572	2	1158.5	0.317103	1135.3	-2.0	0.2	
78.6357	2	1158.5	0.317006	1135.6	-2.0	0.2	
79.4221	2	1158.8	0.317056	1135.4	-2.0	0.2	
80.2163	2	1158.7	0.317001	1135.6	-2.0	0.2	
81.0185	2	1158.5	0.316993	1135.7	-2.0	0.2	
81.8287	2	1158.9	0.317085	1135.3	-2.0	0.2	
82.6470	2	1158.2	0.317046	1135.5	-2.0	0.2	
83.4734	2	1158.9	0.317063	1135.4	-2.0	0.2	
84.3082	2	1158.5	0.317043	1135.5	-2.0	0.2	
85.1512	2	1158.4	0.317160	1135.1	-2.0	0.2	
86.0027	2	1158.5	0.317085	1135.3	-2.0	0.2	
86.8628	2	1158.5	0.317090	1135.3	-2.0	0.2	
87.7314	2	1158.5	0.317136	1135.2	-2.0	0.2	
88.6087	2	1158.3	0.317183	1135.0	-2.0	0.2	
89.4948	2	1158.4	0.317274	1134.7	-2.0	0.1	
90.3897	2	1158.5	0.317243	1134.8	-2.0	0.1	
91.2936	2	1158.6	0.317229	1134.8	-2.1	0.1	
92.2066	2	1158.9	0.317290	1134.6	-2.1	0.1	
93.1286	2	1158.7	0.317037	1135.5	-2.0	0.2	
94.0599	2	1158.9	0.317008	1135.6	-2.0	0.2	
95.0005	2	1159.1	0.317086	1135.3	-2.0	0.1	
95.9505	2	1158.8	0.316994	1135.7	-2.0	0.2	
96.9100	2	1158.3	0.317007	1135.6	-2.0	0.2	
97.8791	2	1158.6	0.317116	1135.2	-2.0	0.2	
98.8579	2	1158.6	0.316964	1135.8	-2.0	0.2	
99.8465	2	1158.7	0.317169	1135.0	-2.0	0.1	
100.8450	2	1158.9	0.316968	1135.8	-2.0	0.2	
101.8534	2	1158.7	0.316960	1135.8	-2.0	0.2	
102.8720	2	1159.2	0.316923	1135.9	-2.0	0.2	

f_c (kHz)	I_c (A)	P_{ref} (W)	T_{imp} (s)	P_i (W)	δ_{Pi} (%)	δ_{ad} (%)	Remark
103.9007	2	1158.7	0.317062	1135.4	-2.0	0.2	
104.9397	2	1158.8	0.317029	1135.5	-2.0	0.2	
105.9991	2	1159.8	0.317016	1135.6	-2.1	0.1	
107.0490	2	1159.4	0.316956	1135.8	-2.0	0.2	
108.1194	2	1159.7	0.317142	1135.1	-2.1	0.1	
109.2006	2	1158.9	0.317231	1134.8	-2.1	0.1	
110.2926	2	1158.6	0.317229	1134.8	-2.1	0.1	
111.3956	2	1158.5	0.114475	3144.8	171.5	173.6	
112.5095	2	1159.0	0.317328	1134.5	-2.1	0.1	
113.6346	2	1158.6	0.317311	1134.5	-2.1	0.1	
114.7710	2	1158.6	0.317287	1134.6	-2.1	0.1	
115.9187	2	1158.3	0.317276	1134.7	-2.0	0.1	
117.0779	2	1159.4	0.317310	1134.5	-2.1	0.0	
118.2486	2	1159.4	0.317297	1134.6	-2.1	0.0	
119.4311	2	1159.1	0.317303	1134.6	-2.1	0.1	
120.6254	2	1159.0	0.317170	1135.0	-2.1	0.1	
121.8317	2	1159.0	0.317201	1134.9	-2.1	0.1	
123.0500	2	1158.4	0.317191	1135.0	-2.0	0.2	
124.2805	2	1159.1	0.317316	1134.5	-2.1	0.1	
125.5233	2	1159.3	0.317179	1135.0	-2.1	0.1	
126.7785	2	1159.1	0.317271	1134.7	-2.1	0.1	
128.0463	2	1158.8	0.317169	1135.0	-2.1	0.1	
129.3268	2	1158.8	0.317221	1134.9	-2.1	0.1	
130.6201	2	1158.8	0.408241	881.8	-23.9	-21.7	
131.9263	2	1159.0	0.317240	1134.8	-2.1	0.1	
133.24551	2	1159.2	0.317132	1135.2	-2.1	0.1	
134.57797	2	1159.4	0.317124	1135.2	-2.1	0.1	
135.92374	2	1159.5	0.317201	1134.9	-2.1	0.1	
137.28298	2	1159.0	0.317039	1135.5	-2.0	0.2	
138.65581	2	1159.6	0.317173	1135.0	-2.1	0.1	
140.04237	2	1160.1	0.317150	1135.1	-2.2	0.0	
141.44279	2	1159.7	0.317111	1135.2	-2.1	0.1	
142.85721	2	1159.9	0.317039	1135.5	-2.1	0.1	
144.28579	2	1159.6	0.316968	1135.8	-2.1	0.1	
145.72864	2	1159.4	0.316937	1135.9	-2.0	0.2	
147.18593	2	1159.8	0.316863	1136.1	-2.0	0.1	
148.65778	2	1157.8	0.317013	1135.6	-1.9	0.3	
150.00000	2	1157.8	0.317476	1133.9	-2.1	0.1	
150.00000	2	1166.8	0.315143	1142.3	-2.1	0.1	

Differential mode disturbances and signalling in the frequency range 2 kHz to 150 kHz TNI CLC/TR 50579:201

Remark:

Used symbols:

f_c ...	Carrier frequency.
I_d ...	Disturbing current value.
P_{ref} ...	Reference power on the mains frequency (50 Hz).
T_{imp} ...	Measured period of pulses on the LED output of the tested meter.
P_i ...	Power on the mains frequency derived from T_{imp}.
δ_{Pi} ...	Relative error of the P_i
δ_{ad} ...	Additional percentage error.

Uncertainty of the δ_{Pi} $U(\delta_{Pi})$: ≤0.1%

LED pulse period; f_{mod} = 0 Hz (CW)

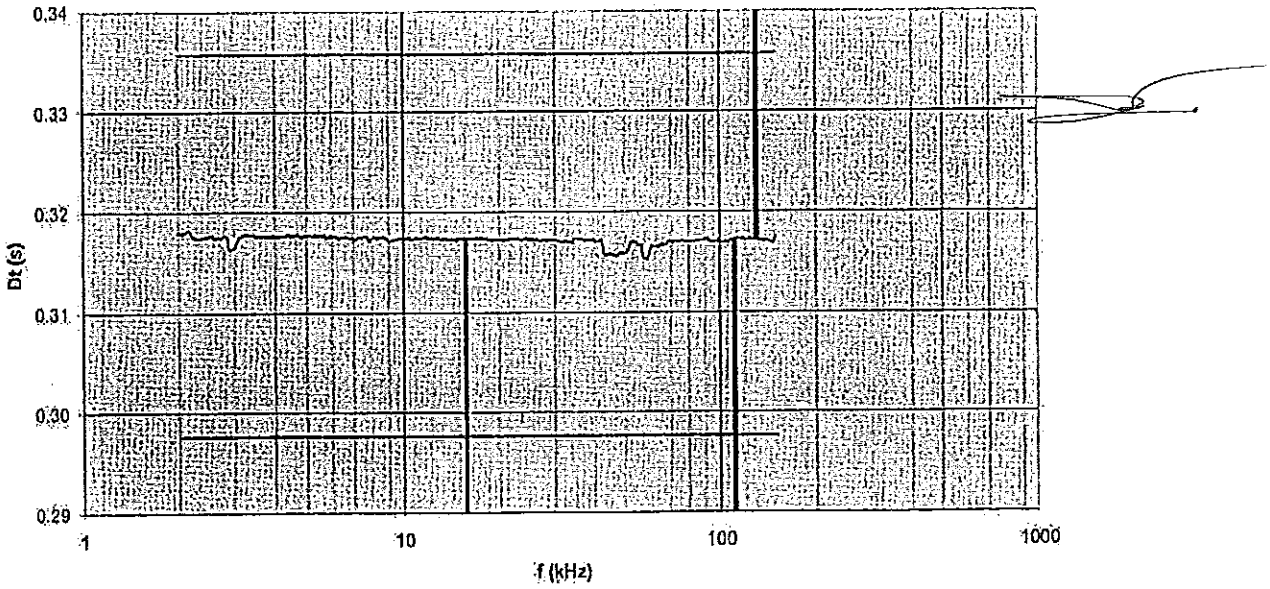

Fig. 1: Measured pulse period on the LED output of the tested meter during the test. Disturbance; unmodulated carrier.

Remark:
Observed three momentary changes in readings of pulse period was completely random and there is no sign of influence of the EUT. The response of the EUT on the three frequencies was verified, but the results are not presented here in this report.

Test set-up:

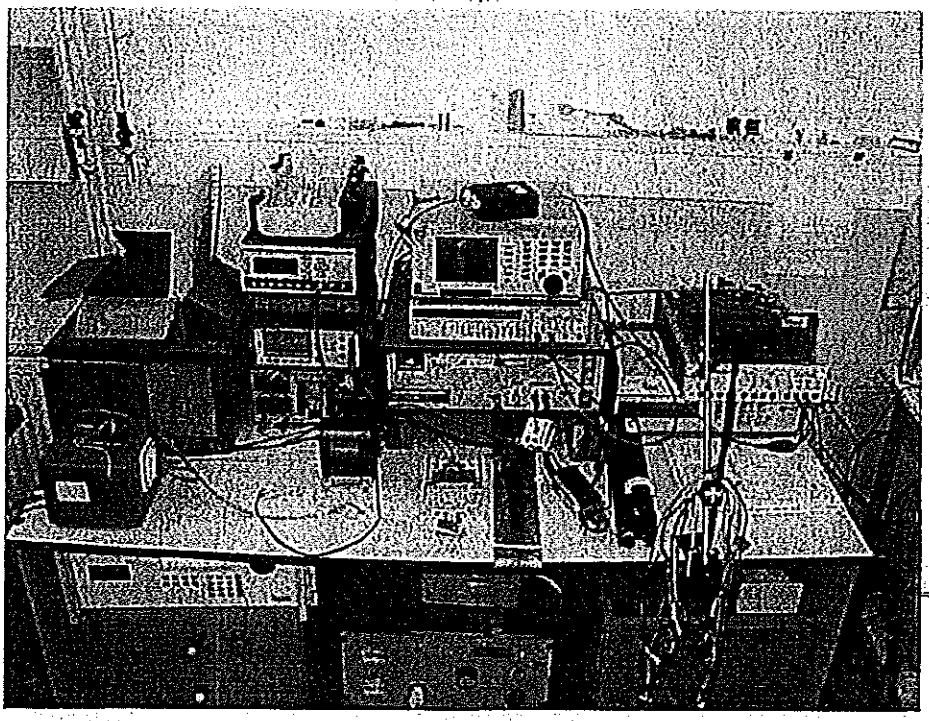

Fig. 3: Test set-up.

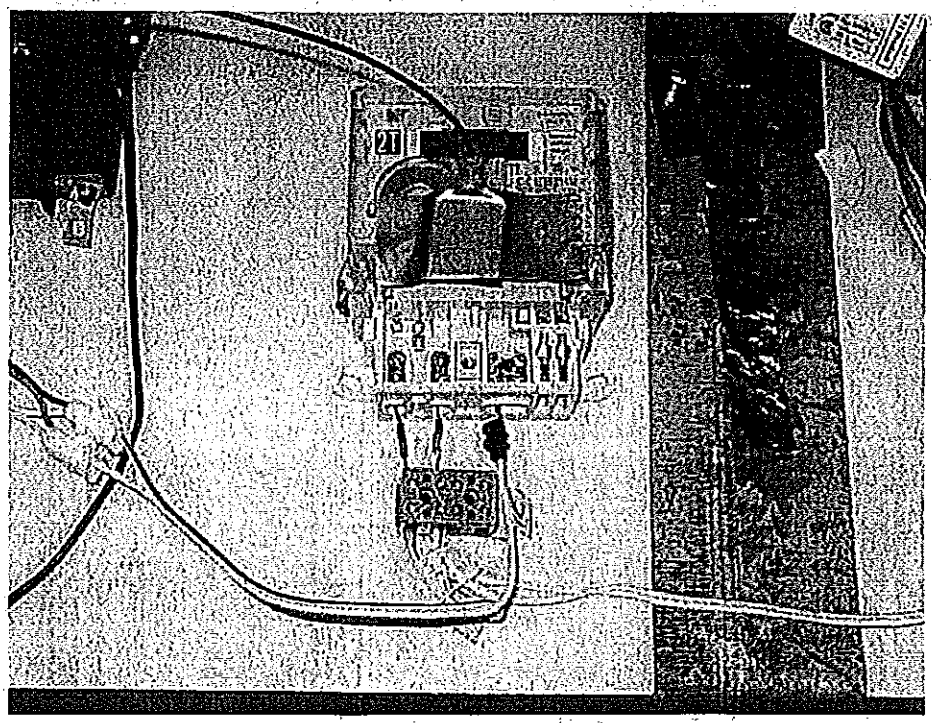

Fig. 4: Test set-up – detail.

Modifications for improvement:

No modifications introduced.

Validace softwaru
Validation of Software

ČMI TESTCOM Praha:
Protokol o zkoušce č. 8552-PT-S0032-15 (3 listy + 4 listy příloh)

CMI TESTCOM Praha:
Test Report No. 8552-PT-S0032-15 (3 pages + 4 pages of Annexes)

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tel. +420 545 555 111
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L 1341

Testing laboratory No. 1341 accredited by the Czech Accreditation Institute according to ISO/IEC 17025:2005

Laboratory: TESTCOM Praha, Hvožďanská 3, 148 00 Praha 4
Department of frequency engineering, tel. +420 271 192 179, fax. +420 271 192 266

TEST REPORT

No. 8552-PT-S0032-15

IVEL 3CFC electricity meter, validation of software

Date of issue: 4 January 2016

Customer: Daisy Technology Ltd., Izgrev, 15 Tintiava str., Sofia, 1113, Bulgaria

User:

Measuring instrument: single phase electricity meter type IVEL 3CFC

Guideline: 614-MP-C001, WELMEC 7.2, Issue 5

SW manufacturer: Daisy Technology Ltd., Izgrev, 15 Tintiava str., Sofia, 1113, Bulgaria

Description: single phase electricity meter software

SW type: single purpose, built-in

Software version and identification: Software version: **01**, 151031
CRC: **CEC7**

Commission: The Measuring Instruments Directive (MID) gives the essential requirements for certain measuring instruments used in the European Union. The software of the measuring instrument was validated to show conformance with the essential requirements of the MID.
The validation was based on the report WELMEC MID Software Requirements Guide (WELMEC Guide 7.2), where the essential requirements are interpreted and explained for software. This report describes the examination of software needed to state conformance with the MID.

The results of the tests have been obtained following the procedures reported in this Report and are related only to the tested item, date, place and conditions of the test. Test report was issued in two copies as originals.

Date of test: 4 January 2016

Tested by:

Ivana Lacková

Český metrologický institut -85/1-

CMI TESTCOM Praha Director:

Miloš Prchlík

Documentation:

Daisy IVEL 3CFC Block diagram EN.pdf
IVEL 3CFC_FlowChart.doc
IVEL3CFC_Functionaldescr_EN.docx
Commands_3CFC_all.txt
CommDetails_V1.doc
IVEL 3CFC.v00_WELMEC_4.2_P1-7_V0.1.doc
IVEL 3CFC.v00_WELMEC_4.2_T1-8_V0.1.doc
IVEL 3CFC.v20_WELMEC_10.3.3_I3-(1-5)_V0.1.doc
Instr Daisy IVEL 3CFC_rev2.pdf (User manual)
Parameters_description.docx

Test object:

IVEL 3CFC is a single phase static energy meter for active energy measurement. The device is based on STM8L052R8 microprocessor providing all the basic functionality of the meter.

Local User interface has a LCD display only, has no pushbuttons or keys. The meter is provide with an optical communication interface.

According to WELMEC Guide 7.2 issue 5 software identification is formed by CRC16 checksum and also by software version and compilation date. Software version and CRC are shown on LCD display during meter start-up; in a format "s01cCEC7". The whole identification (CRC, software version and date) can be read using an optical interface (OBIS code 0.2.1).

A communication protocol used by the optical interface is designed according to IEC/EN 62056-21, using OBIS codes. Software protection is realized by calculating checksum of firmware, watchdog system and sealing.

Examination procedure:

The validation has been performed according to the WELMEC 7.2 Software Guide, Issue 5 (can be downloaded at www.welmec.org). The validation was performed between 22 December 2015 and 4 January 2016 on device with serial number 1591000003 and 1591000011, together with other type approval tests.

The following requirements have been validated:

- Specific requirements for embedded software for a built-for-purpose measuring instrument (type P)
- Extension I3: Active Electrical Energy Meters
- Extension T: Transmission of legally relevant data (optical sensor)

Checklist for the selection of the configuration is found in annexes I and II to this report (1 sheet). Risk class C has been applied to this instrument.

The following validation methods have been applied:

- identification of the software
- completeness of the documentation
- examination of the operating manual
- functional testing
- software design review
- review of software documentation.

Český metrologický institut 8512

Place of test: Laboratories of CMI TESTCOM Praha.

Results of testing: The following requirements of the WELMEC Software Guide 7.2 have been validated without finding faults:

P1, P2, P3, P4, P5*, P6, P7
I3-1, I3-2, I3-3, I3-4, I3-5, I3-6
T1, T2, T3, T4, T5, T6, T7, T8

Checklists for the P-requirements are found in annex III of this report (1 sheet).
Checklists for the I3-requirements are found in annex IV of this report (1 sheet).
Checklists for the T-requirements are found in annex V of this report (1 sheet).

*** The requirement P5 is not fully kept. Legally relevant software shall have been protected against accidental or unintentional changes. Distinguishing behaviour of the meter in case of software discrepancy is missing.**

The software of the IVEL 3CFC electricity meter (excepting requirement P5) fulfils the essential requirements of the Measuring Instruments Directive (according to WELMEC 7.2 recommendations).

The result applies to the tested item only.

End of Test report.

Český metrologický institut -8512-

Annex I of report No. 8552-PT-S0032-15

Decision on Instrument Type				
		(P)		Remarks
1	Is the entire application software constructed for the measuring purpose?	(Yes)	Yes	
2	If there is general-purpose software, is it accessible by or visible to the user?	(No)	No	
3	Is the user prevented from accessing the operating system if it is possible to switch to an operating mode not subject to legal control?	(Yes)	Yes	
4	Are the implemented programs and the software environment invariable (apart from updates)?	(Yes)	Yes	
5	Are there any means for programming?	(No)	No	

Annex II of report No. 8552-PT-S0032-15

Decision on Required Extensions					
		yes	no	n/a	remarks
L	Does the device have the ability to store the measurement data either on an integrated storage or on a remote or removable storage?		X		
T	Does the device have interfaces for transmission of data to devices subject to legal control OR is the device receiving data from another device subject to legal control?	X			
S	Are there software parts with functions not subject to legal control AND are these software parts desired to be changed after type approval?		X		
D	Is loading of software possible or desired?		X		

Praha, 4 January 2016

Ivana Lacková

Annex III of report No. 8552-PT-S0032-15

Checklist for Type P Requirements						
	test		passed	failed	n/a	remarks
P1	D	Does the required manufacturer documentation fulfil the requirement P1(a-g)?	X			
P2	D F	Is a software identification realised as required in P2?	X			
P3	D F	Are commands entered via the user interface prevented from inadmissibly influencing the legally relevant software and measurement data?	X			
P4	D F	Are commands input via non-sealed communication interfaces of the instrument prevented from inadmissibly influencing the legally relevant software and measurement data?	X			
P5	D F	Are legally relevant software and measurement data protected against accidental or unintentional changes?		X		*
P6	D F	Are legally relevant software secured against the inadmissible modification, loading or swapping of hardware memory?	X			
P7	D F	Are parameters that fix legally relevant characteristics of the measuring instrument secured against unauthorised modification?	X			

D: checks based on documentation
F: functional checks

*** The requirement P5 is not fully kept, Distingushing behaviour of the meter in case of software discrepancy is missing.**

Praha, 4 January 2016

.....
Ivana Lacková

Annex IV of report No. 8552-PT-S0032-15

Checklist for Requirements of Extension I3						
	test		passed	failed	n/a	remarks
I3-1	D F	Fault recovery	X			
I3-2	D F	Back-up facilities	X			
I3-3	D	Indication suitability	X			
I3-4	D F	Inhibit resetting of cumulative measurement value	X			
I3-5	D F	Dynamic behavior	X			
I3-6	D	Imprinted software identification	X			

D: checks based on documentation
F: functional checks

Praha, 4 January 2016

Ivana Lacková

Annex V of report No. 8552-PT-S0032-15

Checklist for Requirements of Extension T						
	test		passed	failed	n/a	remarks
T1	D F	Do transmitted data contain all relevant information necessary to present or further process the measurement result in the receiving module?	X			
T2	D	Are transmitted data protected against accidental and unintentional changes?	X			
T3	D	Are legally relevant transmitted data protected against intentional changes carried out by simple common software tools (for risk classes B&C) or by special sophisticated software tools (for risk classes D&E)?			X	
T4	D	Is it possible for the program that receives transmitted relevant data to verify their authenticity and to assign the measurement values to a particular measurement?	X			
T5	D	B&C) Are keys treated as legally relevant data and kept secret and protected against compromise by simple software tools?			X	
T6	D F	Are data that have been detected as having been corrupted, prevented from being used?	X			
T7	D	Is it ensured that the measurement is not inadmissibly influenced by a transmission delay?	X			
T8	D F	Is it ensured that no measurement data get lost if network services become unavailable?	X			

D: checks based on documentation
F: functional checks
* functional tests were performed using optical interface

Praha, 4 January 2016

Ivana Lacková

Předpověď spolehlivosti
Reliability prediction

Daisy Technology Ltd.: QA Test Report z 12.11.2015 (9 listů)

Daisy technology Ltd.: QA Test Report dated November 12, 2015 (9pages.

ISO-9001 Certified
ISO-17025 Certified
DAISY TECHNOLOGY LTD.

QA Test Report

Daisy IVEL 3CFC
(Reliability Prediction)

Report Date :
November, 12, 2015

15-17, Tintlava str, 1113, Izgrev, Sofia, Bulgaria
Tel: +359 2 960 7117; Fax: +359 2 962 9381
www.daisytechbg.com

1. General

1.1. Introduction

This document presents the reliabilities prediction of the static single phase energy meter, type "**Daisy IVEL 3CFC**".

1.2. Abbreviations and Definitions

MTBF (Mean Time Between Failure)
The average between failure occurrences. The sum of the operating time of a machine divided by the total number of failures.

MTTF (Mean Time To Failure)
A basic measure of system reliability for non-repairable items: The total number of life units of an item divided by the total number of failures within that population, during a particular measurement interval under stated conditions.

Fault
State of an item characterized by inability to perform a required function, excluding the inability during preventive maintenance or other planned actions, or due to lack of external resources.

Failure rate (instantaneous)
$\lambda(t)$
Limit, if it exists, of the quotient of the conditional probability that the instant of a failure of a non-repaired item falls within a given time interval $(t, t + \Delta t)$ and the duration of this time interval, Δt, when Δt tends to zero, given that the item has not failed up to the beginning of the time interval.

Reliability (performance)
The ability of an item to perform a required function under given conditions for a given time interval.

FIT
Failures/10^9 hours

GF
Ground, Fixed

1.2. The purpose of the prediction is equipment design decisions.

2. Reliability prediction report summary

The reliabilities prediction results of the product "**Daisy IVEL 3CFC**" is presented in table1.

Total device failure rate, FITs	795.244647
MTBF, hours	1 257 474.670
Failure rate, %/year	0.696634311
Expected life, hours	150 000

3. Reliability prediction method

Reliability prediction – using the parts stress method according to:

EN 62059 – 41: Electricity metering equipment – Dependability, Part 41: Reliability prediction
EN 61709: Electronic components reliability. Reference conditions for failure rates and stress model for conversions

3.1. Environment & Temperature

The reliability Prediction was performed for the following Environment and Temperature:

Operating Temperature : 23 °C
Environmental condition: GF

3.2. General Assumptions

- Failure rates of components are constant during equipment life period.
- The failures of different components are considered statistically independent.
- The assembly reliability model is a series one - failure in any component causes an assembly failure.
- Only hardware failures were taken into consideration in the reliability prediction.
- Failure Distribution is exponential.

3.3. Equations for calculations

- MTBF Calculation Model
  The formula for MTBF calculation is:

$$\lambda = \sum_{i=1}^{n} \lambda_i \qquad MTBF = \frac{1}{\lambda}$$

Where: λ_i is failure rate of its item
n is number of items.

- The failure rate under operating conditions is calculated as follows:

$\lambda = \lambda_{ref} \times \pi_U \times \pi_I \times \pi_T$
Where:
- λ_{ref} is the failure rate under reference conditions;
- π_U is the voltage dependence factor;
- π_I is the current dependence factor;
- π_T is the temperature dependence factor.

- Stress factor for voltage dependence, π_U:

$$\pi_U = \exp\left\{C_3\left[(U/U_{rat})^{C_2} - (U_{ref}/U_{rat})^{C_2}\right]\right\}$$

Where:
U is the operating voltage in volts;
U_{ref} is the reference voltage in volts;
U_{rat} is the rated voltage in volts;
C_2, C_3 are constants.

- Stress factor for current dependence, π_I

$$\pi_I = \exp\left\{C_4\left[\left(I/I_{rat}\right)^{C5} - \left(I_{ref}/I_{rat}\right)^{C5}\right]\right\}$$

Where:
I is the operating current in amperes;
I_{ref} is the reference current in amperes;
I_{rat} is the rated current in amperes;
C_4, C_5 are constants.

- Stress factor for temperature dependence, π_T

$$\pi_T = \frac{A \times e^{Ea_1 \times z} + (1-A) \times e^{Ea_2 \times z}}{A \times e^{Ea_1 \times z_{ref}} + (1-A) \times e^{Ea_2 \times z_{ref}}}$$

with $z = \frac{1}{k_0}\left(\frac{1}{T_{amb,ref}} - \frac{1}{T_2}\right)$ and $z_{ref} = \frac{1}{k_0}\left(\frac{1}{T_{amb,ref}} - \frac{1}{T_1}\right)$ in $(eV)^{-1}$

Where:
A is a constant;
Ea_1, Ea_2 are activation energies in (eV);
$k_0 = 8{,}616 \times 10^{-5}$ eV/K;
$T_{amb,ref} = 313$ K;
$T_1 = (\theta_1 + 273)$ in kelvins;
$T_2 = (\theta_2 + 273)$ in kelvins.

The temperatures θ_1 and θ_2 in degrees Celsius above mean:

– for integrated circuits
  θ_1: reference virtual (equivalent) junction temperature
  θ_2: actual virtual (equivalent) junction temperature
– for discrete semiconductors and optoelectronic components
  θ_1: reference junction temperature
  θ_2: actual junction temperature
– for capacitors
  θ_1: reference capacitor temperature
  θ_2: actual capacitor temperature
– for resistors
  θ_1: average reference temperature of the resistor element (for example, film)
  θ_2: average actual temperature of the resistor element
– for inductors
  θ_1: average reference temperature of the winding
  θ_2: average actual temperature of the winding
– for other electronics components
  θ_1: reference ambient temperature
  θ_2: actual ambient temperature

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- Life expectancy for aluminum electrolitic capacitors (non solid electrolyte)

$$\text{Life expectancy (hours)} = \text{qualification test duration} \times 2^{\left(\frac{(T_M+5)-T_c}{10}\right)}$$

with T_M : maximum temperature of the climatic category

$$t_c = t_{ambient} + 5°C$$

- Life expectancy for light emitting diodes

$$\theta = \theta_0 \times K_0 \times K_1 \times K_2 \times K_3 \quad \text{hours}$$

Diode Types	Life expectancy θ_0 expressed in hours
0,85 µm Diodes	$2,3\times10^{5} e^{7000\left(\frac{1}{t_j+273}-\frac{1}{343}\right)}$ (0,6 electron-volt)
1,3 µm Diodes	$8,7\times10^{6} e^{7000\left(\frac{1}{t_j+273}-\frac{1}{343}\right)}$ (0,6 electron-volt)

k_0, k_1, k_2, k_3 are coefficients, given in IEC 62380

- Life expectancy for optocouplers

$$\theta = \theta_0 \times K_0 \times K_1 \times K_2 \times K_3 \quad \text{hours}$$

Life expectancy θ_0
$0,4e^{\frac{4640}{t_j+273}}$

k_0, k_1, k_2, k_3 are coefficients, given in IEC 62380

4. ASSEMBLY COMPOSITE REPORT

These Appendices describe in detail the results of the reliability prediction at operating state. It provides also the contribution of each component failure rate to the next higher level.

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Part Number	Ref Des	Failure Rate, Unit	Quantity	Failure Rate	Contribution, %
Capacitors					
CC0603JRX7R8BB104	C202, C203, C205, C206	0.166	4	0.663	0.083
CC0603KRNPO9BN101	C201, C204	0.184	2	0.369	0.046
CC0603KRX7R9BB104	C109, C103, C104, C110, C111, C112, C113, C121, C122, C123, C207, C304	0.184	12	2.206	0.276
CC0603KRX7R9BB104	C116, C119, C210, C300, C309, C310, C313	0.211	7	1.475	0.186
CC0603JPNPO9BN120	C101, C102	0.184	2	0.369	0.046
CC0603KRNPO9BN102	C105, C117, C312	0.184	3	0.552	0.069
CC0603KRX7R9BB103	C108, C115, C212	0.184	3	0.552	0.069
CC0603KRX7R9BB103	C200	0.211	1	0.211	0.027
CC0603KRNPO9BN101	C107, C118, C201, C204, C211, C306	0.211	6	1.265	0.159
CC0603KRNPO9BN101	C303	0.397	1	0.397	0.049
CC0603JRNPO9BN471	C108	0.184	1	0.184	0.023
CC0603KRX7R7BB105	C109, C114, C208, C217, C305	0.322	5	1.612	0.203
CC0805KKX5R8BB106	C209, C307	0.314	2	0.629	0.079
CC0805KKX5R8BB106	C302	1.061	1	1.061	0.133
RE474	C213, C214	1.070	2	2.140	0.268
CC0805KRX7R9BB103	C216	0.508	1	0.508	0.064
CC0603JRNPO9BN270	C306	0.211	1	0.211	0.027
EHR-101-M-35-C5	C215	5.531	1	5.531	0.695
EHR-102-M-25-C5-1321	C301	11.514	1	11.514	1.448
TAJA106M016S	C311	5.073	1	5.073	0.639
Diodes					
BAS70	D101	0.186	1	0.185	0.023
SP0304BAHTG	D106	0.433	1	0.433	0.054
SS14	D102	0.895	1	0.895	0.113
S1M-E3/5AT	D200, D202, D203	1.185	3	3.555	0.447
S1M-E3/5AT	D100	1.067	1	1.067	0.134
BAT54C	D201	0.229	1	0.229	0.029
SMBJ22CA-E3/52	D204	0.216	1	0.216	0.027
MCL4148-TR	D301	1.036	1	1.036	0.130
1SMB5927BT3	D302	0.484	1	0.484	0.061
Optoelectronic components					
L-C192LGCT T K9 AP	D102, D103, D104, D105, D110	1.239	5	6.193	0.779
HBS-436AR-C	D109	1.108	1	1.108	0.139
L-514EIR3C	D108	6.255	1	6.255	0.786
PD333-3B/H0/L2	D107	36.371	1	36.371	4.574
VO615A-3X019T	U106, U107	56.114	2	112.227	14.112
LTV-814S	U201	56.114	1	56.114	7.056
GDSYF3125WP	LCD100	10.000	1	10.000	1.257
Inductors					
SCDS4D28T-101N	L300	30.185	1	30.185	3.793
NL453232T-101K	L301	28.779	1	28.779	3.619
NL453232T-100K	L200	28.779	1	28.779	3.619
BLM18GG471SN1	FB100, FB101, FB200, FB201, FB202	0.877	5	4.384	0.551
Transistors					
BSS138LT1G	Q102, Q102, Q301, Q302	0.495	4	1.980	0.249
BC807-25	Q103	0.751	1	0.751	0.094
BC807-25	Q101	0.727	1	0.727	0.091
BC817-25	Q105	0.345	1	0.345	0.043
BC817-25	Q104, Q106	0.337	2	0.673	0.085
BC817-25	Q200	0.337	1	0.337	0.042
NX3008PBKS	Q300	0.826	1	0.826	0.104
Resistors					
RC 0805 JR - 07 1K L	R109	0.201	1	0.201	0.025
RC 0603 JR - 07 3K3 L	R101, R108, R145, R146, R247, R311	0.201	6	1.207	0.152
RC 0603 JR - 07 10K L	R102, R103, R104, R106, R107, R109, R110, R111, R112, R113, R114, R115, R118, R119, R120, R121, R122, R123, R125, R131, R132, R133, R136, R138, R200, R243, R312	0.201	27	5.432	0.684
RC 0603 FR - 07 46K4 L	R105	0.201	1	0.201	0.025
RC 0603 JR - 07 1M L	R116, R137	0.201	2	0.402	0.051
RC 0603 FR - 07 22K L	R117	0.201	1	0.201	0.025
RC 0805 JR - 07 10K L	R124	0.201	1	0.201	0.025
RC 0603 JR - 07 1K L	R126, R127, R128, R129, R140, R150, R151, R154, R157, R230	0.261	10	2.609	0.328
RC 0603 JR - 07 220K L	R130, R139, R142	0.201	3	0.604	0.076
RC 0603 JR - 07 47K L	R134, R252	0.201	2	0.402	0.051
RC 0603 JR - 07 470K L	R135	0.201	1	0.201	0.025
RC 0603 JR - 07 470R L	R140, R141	0.201	2	0.402	0.051
RC 0603 JR - 07 4K7 L	R143	0.201	1	0.201	0.025
RC 0603 JR - 07 33K L	R144, R158, R159, R203, R205	0.201	5	1.006	0.127
RC 0603 JR - 07 5K6 L	R147, R237	0.201	2	0.402	0.051
RC 0603 JR - 07 1K5 L	R149	0.201	1	0.201	0.025
RC 0603 JR - 07 2M2 L	R152, R153	0.201	2	0.402	0.051
RC 0603 JR - 07 3K1 L	R155	0.201	1	0.201	0.025
RC 0603 JR - 07 820K L	R156	0.201	1	0.201	0.025
RT 0603 FRE - 07 330R L	R201, R206, R212, R213	0.201	4	0.805	0.101
RC 0603 JR - 07 22K L	R202, R204	0.201	2	0.402	0.051
RT 0805 FRE - 07 82K5 L	R207, R208, R209, R210, R211, R214, R215, R216, R217, R218	0.221	10	2.213	0.278
RT 0603 FRE - 07 15K L	R219, R231, R307	0.201	3	0.604	0.076
RT 0805 FRE - 07 220K L	R220, R221, R222, R223, R224, R225, R226, R227, R228, R229	0.216	10	2.161	0.272
KNP 3WS J B E 220R	R232	112.447	1	112.447	14.140
RC 0805 JR - 07 10K L	R233, R234, R235, R236, R238, R239, R240, R241	0.227	8	1.813	0.228
RC 1210 JR - 07 56R L	R242	0.211	1	0.211	0.027
RC 0805 JR - 07 27K L	R244, R245, R246, R249, R250, R251	0.396	6	2.374	0.298
RC 0603 JR - 07 330K L	R248	0.201	1	0.201	0.025
RC 0603 JR - 07 10R L	R300	0.201	1	0.201	0.025
RC 0603 JR - 07 51R L	R301	0.201	1	0.201	0.025
RC 0603 JR - 07 100K L	R302, R309	0.201	2	0.402	0.051
RC 0805 JR - 07 330R L	R303	0.201	1	0.201	0.025
RT 0603 FRE - 07 56K L	R304	0.201	1	0.201	0.025
RT 0603 FRE - 07 110K L	R305	0.201	1	0.201	0.025
RT 0603 FRE - 07 18K L	R306	0.201	1	0.201	0.025
RT 0603 FRE - 07 31K L	R308	0.201	1	0.201	0.025
Integrated Circuits					
CAT24C512WI-GT3	U100	6.382	1	6.382	0.800
M24C08-WMN6TP	U101	4.948	1	4.948	0.622
TPS27081ADDCR	U103	0.001	1	0.001	0.000
STM8L052R8T6	U104	16.954	1	16.954	2.133
LMV331IW5	U105	0.184	1	0.184	0.021
BL0930	U200	3.483	1	3.483	0.438
RT7295 GE	U300	0.016	1	0.016	0.002
TPS76901QDBVRG4	U301	0.008	1	0.008	0.001
CAT8009TBI-GT3	U302	0.498	1	0.498	0.063
Miscellaneous					
ER14250-3FP	BT300	20	1	20.000	2.515
MYN23-751K Long Life	RV200	40	1	40.000	5.030
MYN12-751K	RV201	40	1	40.000	5.030
MC-146 32.768kHz 7pF	XT100	37	1	37.000	4.653
PG585110D22	SW100	102	1	102.000	12.826
Cable connections		1.045	10	10.450	1.314
PCB		3	1	3.000	0.377
	Total device failure rate, FITs			795.244647	
	MTBF, hours @ 23C			1 257 474.670	
	Failure rate, %/year			0.6956534311	

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Designator	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	I	I_{ref}	L_{rt}	C_4	C_3	π_i	A	Ea_1	Ea_2	Θ_1	Θ_2	ΔT_{ref}	π_T	λ FIT	FR	DATA SOURCE
C202, C203, C205, C206	1	12.5	25	1	4	0.158817						1	1	0.35		40	23	0	0.474550	2.2	0.165803	MIL-HDBK-217F
C201, C204	3.3	25	50	1	4	0.176224						1	1	0.35		40	23	0	0.474550	2.2	0.183592	MIL-HDBK-217F
C100, C103, C104, C110, C111, C112, C113, C121, C122, C127, C207, C304	3.3	25	50	1	4	0.176224						1	1	0.35		40	23	0	0.474550	2.2	0.183582	MIL-HDBK-217F
C118, C119, C210, C300, C307, C310, C313	5	25	50	1	4	0.201697						1	1	0.35		40	23	0	0.474550	2.2	0.210785	MIL-HDBK-217F
C101, C102	3.3	25	50	1	4	0.176224						1	1	0.35		40	23	0	0.474550	2.2	0.183242	MIL-HDBK-217F
C105, C117, C312	3.3	25	50	1	4	0.176224						1	1	0.35		40	23	0	0.474550	2.2	0.183582	MIL-HDBK-217F
C108, C115, C212	3.3	25	50	1	4	0.176224						1	1	0.35		40	23	0	0.474550	2.2	0.183582	MIL-HDBK-217F
C200	5	25	50	1	4	0.201697						1	1	0.35		40	23	0	0.474550	2.2	0.210785	MIL-HDBK-217F
C107, C118, C209, C204, C211, C308	5	25	50	1	4	0.201697						1	1	0.35		40	23	0	0.474550	2.2	0.210785	MIL-HDBK-217F
C303	12.6	25	50	1	4	0.370934						1	1	0.35		40	23	0	0.474550	2.2	0.35736	MIL-HDBK-217F
C106	3.3	25	50	1	4	0.176224						1	1	0.35		40	23	0	0.474550	2.2	0.183582	MIL-HDBK-217F
C109, C114, C208, C217, C305	3.3	6	16	1	4	0.305919						1	1	0.35		40	23	0	0.474550	2.2	0.322414	MIL-HDBK-217F
C206, C307	5	12.6	25	1	4	0.301104						1	1	0.35		40	23	0	0.474550	2.2	0.314454	MIL-HDBK-217F
C302	12.6	12.6	25	1	4	1.016129						1	1	0.35		40	23	0	0.474550	2.2	1.060862	MIL-HDBK-217F
C213, C214	103	200	400	1.07	3.45	0.773936						1	0.999	0.6	1.54	40	23	0	0.344478	4.20	1.066641	MIL-HDBK-217F
C216	16	25	50	1	4	0.436702						1	1	0.35		40	23	0	0.474550	2.2	0.406181	MIL-HDBK-217F
C306	5	25	50	1	4	0.201697						1	1	0.35		40	23	0	0.474550	2.2	0.210785	MIL-HDBK-217F
C215	16	25	35	1	1.36	0.603419						1	0.87	0.5	0.85	40	23	0	0.317157	28.9	6.836844	MIL-HDBK-217F
C301	12.6	20	25	1	1.36	0.686400						1	0.87	0.5	0.85	40	23	0	0.317157	64.3	11.51440	MIL-HDBK-217F
C311	3.6	8	16	1	1.05	0.749199						1	0.35	0.54	0	40	23	0	0.760422	8.9	5.073064	MIL-HDBK-217F
						1						1							1		0	
D101						1						1	1	0.4		55	23	0	0.2165	0.66	0.15610	Manufacturer
D108						1						1	1	0.4		55	23	0	0.2165	2	0.432	Manufacturer
D109						1						1	1	0.4		40	23	0	0.474672	2.1	0.495505	MIL-HDBK-217F
D200, D202, D203						1						1	1	0.4		40	25	2	0.473976	2.5	1.184944	MIL-HDBK-217F
D300						1						1	1	0.4		40	23	0	0.426622	2.5	1.066554	MIL-HDBK-217F
D301						1						1	1	0.4		55	27	4	0.266857	0.66	0.176107	Manufacturer
D204						1						1	1	0.4		55	23	0	0.2165	1	0.2165	Manufacturer
D303						1						1	1	0.4		55	26	3	0.253320	4.00	1.013	Manufacturer
D302						1						1	1	0.4		55	33	10	0.403914	1	0.403914	Manufacturer
						1						1							1		0	
D102, D103, D104, D105, D113						1	0.5	17.5	25	1.4	8	0.994546	1	0.05		40	25	2	0.29724	4.19	1.239642	MIL-HDBK-217F
D100						1	1.0	15	30	1.4	8	0.994548	1	0.05		40	24	1	0.272953	4.08	1.107575	MIL-HDBK-217F
D106						1	2	25	30	1.4	8	0.994548	1	0.05		40	24	1	0.272953	23.04	6.254544	MIL-HDBK-217F
D107						1						1	1	0.34		40	23	0	0.527876	68.9	36.37007	MIL-HDBK-217F
U106, U107						1						1	1	0.65		40	23	0	0.250607	224	56.11353	MIL-HDBK-217F
U201						1						1	1	0.65		40	23	0	0.250607	224	56.11353	MIL-HDBK-217F
LCD100						1						1							1	10	10	Manufacturer
						1						1							1		0	
L300						1						1	0.996	0.06	1.13	40	23	0	0.876448	34.4	30.16496	MIL-HDBK-217F
L301						1						1	0.996	0.06	1.13	40	23	0	0.876448	32.82	28.77648	MIL-HDBK-217F
L200						1						1	0.996	0.06	1.13	40	23	0	0.876448	32.82	28.77648	MIL-HDBK-217F
FB100, FB101, FB200, FB201, FB202						1						1	0.996	0.06	1.13	40	23	0	0.876448	1	0.876448	[illegible] SN-313
						1						1							1		0	
Q100, Q102, Q301, Q302	5	25	50	8	1.4	0.994549						1	0.9	0.3	0.7	40	23	0	0.497609	1	0.494605	Manufacturer
Q103	28	22.5	45	8	1.4	1.070327						1	0.9	0.3	0.7	40	23	0	0.497609	1.47	0.727425	Manufacturer
Q101	3.3	22.5	45	8	1.4	0.994549						1	0.9	0.3	0.7	40	23	0	0.497609	1.47	0.727406	Manufacturer
Q105	27	22.5	45	8	1.4	1.01521						1	0.9	0.3	0.7	40	23	0	0.497609	0.68	0.344524	Manufacturer
Q104, Q106	5	22.5	45	8	1.4	0.994549						1	0.9	0.3	0.7	40	23	0	0.497609	0.68	0.336529	Manufacturer
Q300	16	22.5	45	8	1.4	0.994902						1	0.9	0.3	0.7	40	23	0	0.497609	0.68	0.336649	Manufacturer
Q309	5	16	35	8	1.4	0.994547						1	0.9	0.3	0.7	40	23	0	0.497609	1.07	0.529476	Manufacturer
						1						1							1		0	
R180						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R101, R106, R145, R146, R247, R311						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R102, R103, R104, R100, R107, R109, R110, R111, R112, R113, R114, R115, R118, R119, R120, R121, R122, R123, R125, R131, R132, R133, R136, R139, R200, R243, R312						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R105						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R116, R137						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R117						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R124						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R126, R127, R128, R129, R148, R150, R151, R154, R157, R230						1						1	0.873	0.16	0.44	40	34	11	0.869746	0.3	0.260924	Manufacturer
R130, R139, R142						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R134, R232						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R135						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R140, R141						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R147						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R144, R158, R159, R203, R205						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R147, R227						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R148						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R152, R153						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R155						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R176						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R201, R206, R212, R213						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R202, R204						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R207, R208, R209, R210, R211, R214, R215, R216, R217, R218						1						1	0.873	0.16	0.44	40	27	4	0.737713	0.3	0.221314	Manufacturer
R219, R231, R237						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R220, R221, R222, R223, R224, R225, R226, R227, R228, R229						1						1	0.873	0.16	0.44	40	26	3	0.720415	0.3	0.210124	Manufacturer
R232						1						1	0.873	0.16	0.44	40	29	7	0.791875	142	112.4447	MIL-HDBK-217F
R233, R234, R235, R236, R238, R239, R240, R241						1						1	0.873	0.16	0.44	40	28	6	0.755333	0.3	0.226015	Manufacturer
R242						1						1	0.873	0.16	0.44	40	25	2	0.703481	0.3	0.211044	Manufacturer
R244, R245, R246, R249, R250, R251						1						1	0.873	0.16	0.44	40	52	29	1.318778	0.3	0.395633	Manufacturer
R248						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R300						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R301						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R302, R309						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R303						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R304						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R305						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R306						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
R308						1						1	0.873	0.16	0.44	40	23	0	0.67067	0.3	0.201201	Manufacturer
						1						1										
U100						1						1	0.3	0.3	0.6	40	23	0	0.35342	18	6.36156	Manufacturer
U101						1						1	0.3	0.3	0.6	40	23	0	0.35342	14	4.947883	Manufacturer
U102						1						1	0.9	0.3	0.7	125	23	0	0.01412	0.1	0.001412	Manufacturer
U104						1						1	0.3	0.3	0.6	40	23	0	0.35342	49	10.00417	Manufacturer
U105						1						1	0.9	0.3	0.7	125	23	0	0.01412	11.6	0.163792	Manufacturer
U200						1						1	0.9	0.3	0.7	40	23	0	0.497600	7	3.483253	Manufacturer
U300						1						1	0.9	0.3	0.7	125	26	3	0.016012	1	0.016012	Manufacturer
U301						1						1	0.9	0.3	0.7	125	31	8	0.019683	0.4	0.007875	Manufacturer
U302						1						1	0.9	0.3	0.7	40	23	0	0.497600	1	0.497600	Manufacturer
						1						1							1		0	
RT300						1						1							1	20	20	IEC 62380
RV300						1						1							1	40	40	IEC 62380
RV201						1						1							1	40	40	IEC 62380
XT100						1						1							1	37	37	MIL-HDBK-217F
SW100						1						1							1	102	102	MIL-HDBK-217F

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LIFETIME CALCULATIONS

LEDS

Designator	Part No.	Reference lifetime - θ_0, hours	Influence					Expected lifetime - θ, hours
			I_f, °C	K_0	K_1	K_2	K_3	
D108	L-514EIR3C	205 240 677.971	24	14.286	0.1	0.7	1	2 932 009 685.304
D102, D103, D104, D105, D110	L-C192LGCT	5 013 296.339	25	52.632	1	0.45	1	6 249 261 363.801
D100	HB5-436AR-C	5 425 902.981	24	50	1	0.45	1	6 104 140 853.456

OPTOCOUPLERS

Designator	Part No.	Reference lifetime - θ_0, hours	Influence					Expected lifetime - θ, hours
			I_f, °C	K_0	K_1	K_2	K_3	
U106, U107	VO615A-3X019T	2569919.013	23	25	0.1	1.7	1	273 053 895.098
U201	LTV-814S	2569919.013	23	25	0.1	1.7	1	273 053 895.098

Aluminium electrolitic capacitors (non-solid)

Designator	Part No.	Reference lifetime - θ_0, hours	Influence		Expected lifetime - θ, hours
			$T_{ambient}$, °C	T_m, °C	
C215	EHR-101-M-35-C5	2000	23	105	588 133.558
C301	EHR-102-M-25-C5-1321	2000	23	105	588 133.558

Liquid crystal display, TN type

Designator	Part No.	Reference lifetime - θ_0, hours	Influence	Expected lifetime - θ, hours
LCD100	GDSYF3125WP	150 000.000	1	150 000.000
Expected device life, hours				150 000.000

15-17, Tintiava str, 1113, Izgrev, Sofia, Bulgaria
Tel: +359 2 960 7117; Fax: +359 2 962 9381
www.daisytechbg.com

5. Bibliography:

IEC 62059 – 41:2006, *Electricity metering equipment – Dependability, Part 41: Reliability prediction*

IEC 62059 – 11:2002, *Electricity metering equipment – Dependability – Part 11: General concepts*

IEC 61709:1996, *Electronic components reliability. Reference conditions for failure rates and stress model for conversions*

IEC 62380: 2004, *Reliability data handbook – Universal model for reliability prediction of electronics components, PCBs and equipment*

MIL-HDBK-217, Notice 2 – *Military handbook. Reliability prediction of electronic equipment.*

CSA Group

Address:
CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN · GERMANY

Telefon +49-9424-9481-0
Telefax +49-9424-9481-440
E - mail info.bayern@csagroup.org
Internet: http://www.csagroup.org

TEST – Results

Order No.: **M40571-01-00GR**

Applicant	Daisy Technology Ltd.				
Manufacturer	Daisy Technology Ltd.				
Type / Model Name	IVEL 3CFC				
Product Description	Single Phase Meter				
Testing commenced on	14. December 2015	Testing concluded on	17. December 2015	Serial - No.:	1591000006
Pretest	**Tests are made according to** EN 50470-1: 2006 (EMC relevant part: Section 7.4) partly				

Type of test		Limits		Test Results	
Emission / Immunity		margin [dB]	exceeded by [dB]	ok	n.ok
A 4	Conducted emission			☐	☐
A 5	Radiated emission (electric field)			☐	☐
I 2	Electrostatic discharge (ESD)			☐	☐
I 3	Radiated, radio frequency electromagnetic field			☐	☐
I 4	Electrical fast transients (BURST)			■	☐
I 5	Surge			■	☐
I 6	Conducted disturbances induced by radio-frequency fields			☐	☐
I 8	Power frequency magnetic field			☐	☐
I 11	Voltage dips, Short interruptions			☐	☐
I 12	Oscillatory wave			☐	☐

Remarks

The test where performed according the request of the applicant.

This test result consists of 3 page(s). The test result only corresponds to the tested sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

Date	Tested by	Checked by	Test - Result
22.12.2015	Rüdiger Gramsch I'm the author of this document 2015.12.22 08:49:46 +01'00'	Eduard Stangl I confirm the correctness of this document! 2015.12.22 13:02:21 +01'00'	■ passed ☐ not passed

Electrical fast transients / Burst

Description of the test location

Test location: Shielded Room S3

Test specification

Coupling network:	8 kV	
Burst frequency:	5.0 kHz	
Coupling duration:	≥ 60 sec.	
Polarity:	- positive	- negative

Coupling points

Cable description: AC power line (Input)

Screening:	unscreened
Status:	active
Signal transmission:	analogue
Length:	1.0 m

Test result

The requirements are **FULFILLED.**

Remarks: According to the standard the information in all tariff registers of the EuT was checked before and after the test. The deviation to the reference meter was checked continuously.

During fast transients the detected error changes are between -0.5 % to +0.5 %.

Surge

Description of the test location

Test location: AREA 2

Test specification

Pulse amplitude-Power line sym.: 8 kV
Source impedance: 2 Ω + 18 µF

Number of surges: 5 Surges/Phase angle

Phase angle: 60 ° / 240 °

Repetition rate: 60 sec.

Polarity: - positive - negative

Coupling points

Cable description: AC power line (Input)

Screening: unscreened
Status: active
Signal transmission: analogue
Length: 1.0 m

Test result

The requirements are **FULFILLED.**

Remarks: According to the standard the information in all tariff registers of the EuT was checked before and after the test.

Český metrologický institut
Okružní 31, 638 00 Brno
tel. +420 545 555 111
www.cmi.cz

ilac-MRA

L 1341

Testing laboratory No. 1341 accredited by the Czech Accreditation Institute according to ISO/IEC 17025:2005

Pracoviště: Oblastní inspektorát Brno / Regional Inspectorate Brno, Okružní 31, 638 00 Brno
Laboratory: Oddělení primární etalonáže ss a nf elektrických veličin
Department of Primary Metrology of DC and LF Electrical Quantities

PROTOKOL O ZKOUŠCE
TEST REPORT

6011-PT-L0008-16

Datum vystavení: 5.května 2016
Date of issue: *May 5, 2016*

Zákazník: Daisy Technology Ltd.
Customer: 15-17, Tintiava str.
1113 Sofia, Bulgaria

Měřidlo: Jednofázový statický elektroměr
Measuring instrument: *Single-phase static electricity meter*

Výrobce: Daisy
Manufacturer:

Typ: Daisy IVEL 3CFC 2T
Type:

Výrobní číslo: 1691000001
Serial number:

Výsledky zkoušek byly získány za podmínek a s použitím postupů uvedených v tomto protokolu o zkoušce a vztahují se pouze k době a místu provedení zkoušky.
The results of the tests have been obtained following the procedures reported in this Report and are related only to the date, place and conditions of the test.

Datum provedení zkoušky: 4. května 2016
Date of test: *May 4, 2016*

Zkoušku provedl:
Tested by:

Karel Šefčík

Český metrologický institut
-60-

Vedoucí oddělení:
Head of the Department:

Jiří Streit

Specifikace zkoušeného vzorku: *Specs of tested sample:*
230 V; 0,25-5(40) A; k = 10 000 imp/kWh; class A;
1 tarif *(1 tariff)*.

Použité etalony (zařízení): *Measurement standards used (equipment):*
Přenosná stanice na zkoušení elektroměrů Landis+Gyr PTS3.3C, v.č. 53113. Kalibrační list z ČMI Brno č.6011-KL-E051-14.
Použitý etalon má metrologickou návaznost na (mezi)národní etalony.
Portable test bench for testing of electricity meters Landis+Gyr PTS3.3C, s.n. 53113. Calibration Certificate from ČMI No. 6011-KL- E051-14.
Standard used is traceable to (inter)national standards.

Účel zkoušky: *Purpose of the test:*
Elektroměry Daisy IVEL 3CFC byly schváleny v roce 2016 pod schvalovacím číslem TCM 221/16-5351 Notifikovanou osobou ČMI č. 1383 podle Směrnice 2004/22/EP Evropského parlamentu a Rady (V ČR převzata jako Nařízení vlády č. 464/2005 Sb.).
Zákazník firmy Daisy si vyžádal další dodatečnou zkoušku, která je mimo požadavků Směrnice MID. Jedná se o zkoušku zkratem podle normy ČSN EN 50470-3, čl. 8.7.8, ale při zvýšeném proudu 10 000 A. Podle uvedené normy by se mělo zkoušet při proudu pouze 1 200 A.
Meters Daisy IVEL 3CFC were approved under Approval Number TCM 221/16-5351 in Notified Body CMI, No. 1383 according Directive 2004/22/EC of the European Parliament and of the Council in the year 2016 (in the Czech Republic this Directive was transposed to Government Regulation 464/2005 Col.) . A customer of manufacturer Daisy demanded an additional test, which is beyond the requirements of MID. This is a short-circuit test according to the standard EN 50470-3, Art. 8.7.8, but with increased current 10 000 A. According to the mentioned standard should be tested only at current 1200 A.

Zkušební postup: *Test procedure:*
Zkouška byla provedena podle norem EN 50470-1, EN 50470-3. Podrobnosti o zkušebním postupu jsou uvedeny v dokumentu ČMI č. 050-MP-C304 a 611-MP-C150.
Test was performed against standards EN 50470-1:2006, 50470-3:2006. Details of test procedure are described in document ČMI No. 050-MP-C304 and 611-MP-C150.

Podmínky prostředí: *Ambient conditions:*
Průměrné podmínky okolního prostředí během měření byly:
Teplota vzduchu: (23,0 ± 2,0) °C;
Relativní vlhkost: (50 ± 15) %
The average ambient conditions during the measurement were as follows:
Air temperature: (23,0 ± 2,0) °C;
Relative humidity: (50 ± 15) %

Výsledky zkoušky:
Results of testing:

Krátkodobý zkratový proud 10 000 A byl aplikován na elektroměr v laboratoři IVEP Brno na speciálním zařízení pro zkratové zkoušky. Zkouška je popsaná ve zkušebním protokolu IVEP č. 88-1108.

Po zkratu byla chyba elektroměru změřena na zkušební stanici Landis+Gyr typu PTS3.3C v ČMI při napětí 230 V, proudu 5 A a cos $\phi = 1$. Hodnota chyby při uvedené zátěži byla -0,01 %. Dovolená chyba podle normy je ±1,5 %.

A short-time overcurrent 10 000 A was applied to meter in laboratory of IVEP Brno on special equipment for short circuit tests. The test is described in Test report of IVEP No. 88-1108.

After short circuit was measured an error on test bench Landis+Gyr PTS3,3C in CMI at 230 V, 5 A and cos $\varphi = 1$. The value of error was -0,01 %. Allowed error according standard is ±1,5 %.

Nejistota měření:
Measurement uncertainty:

Nejistota měření chyby elektroměru byla 0,15 %.
Measurement uncertainty of meter error was 0,15 %.

Standardní nejistota měření byla určena v souladu s dokumentem EA 4/02. Uvedená rozšířená nejistota měření je součinem standardní nejistoty měření a koeficientu k, který odpovídá pravděpodobnosti pokrytí přibližně 95 %, což pro normální rozdělení odpovídá koeficientu rozšíření $k = 2$.

The standard uncertainty of measurement has been determined in accordance with EA-4/02 document. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k corresponding to a coverage probability of approximately 95 %, which for normal distribution corresponds to a coverage factor k = 2.

Vyjádření o plnění specifikace:
Statement of compliance:

Elektroměr Daisy IVEL 3CFC splňuje zkoušený požadavek normy EN 50470-3:2006, čl. 8.7.8 pro třídu A a to při zvýšené hodnotě zkratového proudu 10 000 A.
Electrical energy meter Daisy IVEL 3CFC has met tested requirement of standard EN 50470-3:2006, Art. 8.7.8 for class A at increased current 10 000 A .

Konec protokolu o zkoušce.
End of test report

Český metrologický institut
-60-

IVEP, a.s.
619 00 Brno, Vídeňská 117a, Czech Republic

SDRUŽENÍ ČESKÝCH ZKUŠEBEN A LABORATOŘÍ - CZECH TESTING LABORATORIES ASSOCIATION

ČLEN ASOCIACE ZKUŠEBEN VYSOKÉHO NAPĚTÍ – MEMBER OF HV TESTING STATIONS ASSOCIATION

ZKUŠEBNA E-51

TEST REPORT No.: 88 - 1108

Daisy IVEL 3CFC 1T Type, Single-Phase Electricity Meter

Petr Kalus

Brno, on: April 13, 2016

Copy No.: 2

ivep®	TEST REPORT No.:	88-1108	Page No.: 2
	Subject of testing:	Daisy IVEL 3CFC 1T Type, Single-Phase Electricity Meter	No. of pages: 7

Type:

Daisy IVEL 3CFC 1T

Kind of test:

Information

Testing conducted in accordance with the following standards and regulations:

ČSN EN 50470-3, part 8.7.8
- short-time overcurrents

and according to customer requirements

Rated values:

Reference voltage : 230 V AC
Highest current level : 40 A AC

Test ordered by:

Daisy Technology Ltd.
15-17, Tintlava str.
1113, Izgrev, Sofia
Bulgaria

Tested sample registration No.:

175/16

Atmospheric conditions:

Air temperature : 16 °C

Manufacturer of the products:

Daisy Technology Ltd.
15-17, Tintlava str.
1113, Izgrev, Sofia
Bulgaria

The test report includes:

No. of pages : 7

of which:
Tables : 3
Oscillograms : 1
Photo : 1

Distribution list:

	copy No.
IVEP archives	: 1
The customer	: 2,3

Test result:

The tested single phase electricity meter type Daisy IVEL 3CFC 1T, serial No. 1691000001 manufactured by Daisy Technology Ltd., 15-17, Tintlava str., 1113, Izgrev, Sofia, Bulgaria.

passed

the „short-time overcurrent" test to ČSN EN 50470-3 , Part No. 8.7.8 standard and according to customer requirement 10 kA / 10 ms.

ZKUŠEBNÍ LABORATOŘ S ČINNOSTÍ UZNANOU SCHVÁZL 019

Date of test:	Testing engineer:	Manager of the testing stations:
April 11 to 12, 2016 (Test No. 16-042)	Petr Kalus	Petr Kalus

1 Tests required and the corresponding parameters

Test	U_z (V)	I_{km} (A)	t_k (ms)	cos φ (1)	No. of short circuits
to ČSN EN 50470-3 part No. 8.7.8 - Short-time overcurrents	242	10000 1)	10	1	1

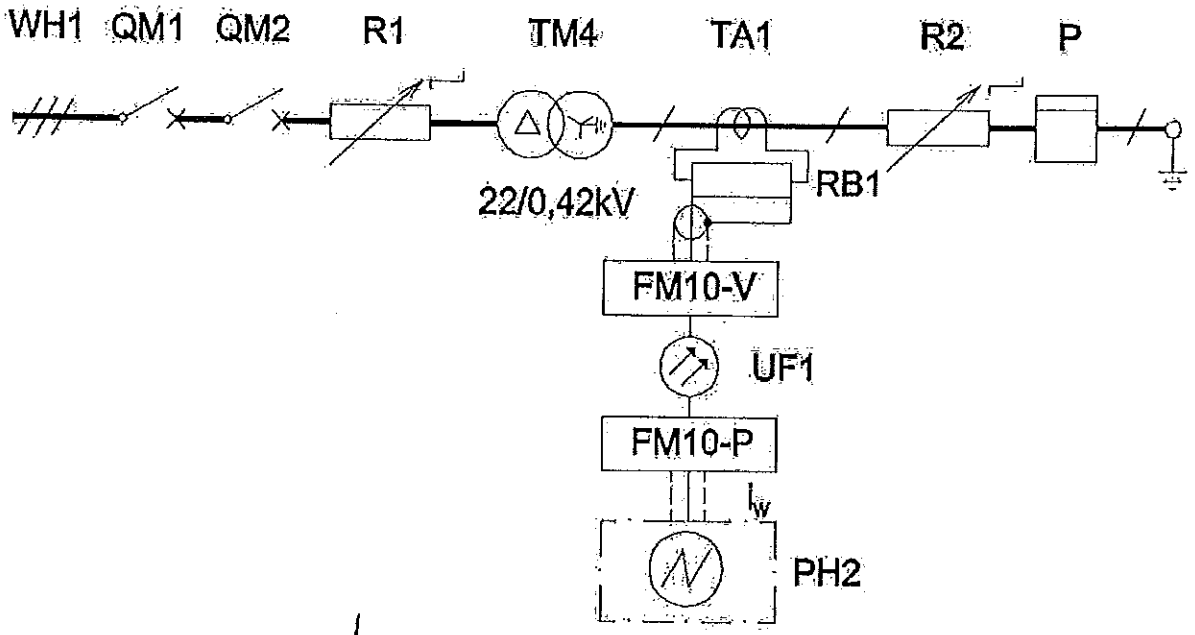
Note:

1) That the customer demanded more current than specified by the relevant standard.

2 Identification of the tested sample

Type	Reference voltage	Highest current	Serial No.	IVEP reg. No.
Daisy IVEL 3CFC 1T	230 V AC	40 A AC	1691000001	175/16

3 Wiring diagram of the test arrangement



4 Measuring instruments and symbols used during the test

WH1 - Power supply overhead line No. 165; 22 kV;
QM1 - Protective circuit breaker 3AE1321-1AE40-0ER2 Z; 24 kV; 8000 A; Siemens brand;
QM2 - SF_6 protective circuit breaker VF 251225; 25 kV; 1 250 A; p=0.5 MPa; EJF Brno; ID No. 00041;
R1 - MV burdens at the short-circuit station; ID No. 00041;
R2 - LV burdens at the short-circuit station; ID No. 00041;
TM4 - KobU 825/20 testing transformer; 1.25 MVA;
- 22000//550/418 V; u_k=2.02/1.98%; BEZ Bratislava; ID No. 00058;
P - Tested electricity meter;
RB1 - Shunt 500 A/2 V; VÚSE; calibration sheet No. 83-0641/07;
UF1 - FM 10 Analogous optoelectronic measuring system; VÚSE Běchovice; s. No. 708; ; calibration sheet No. 83-0641/07;
PH2 - PCL 818 Data registration card; s. No. 92065015; callbration sheet No. 83-0641/07;

ZO - Test operation;
NO - Number oscillogram;
T - Test by short-time overcurrent;

u_k - transformer short-circuit voltage in per cent;
U_z - rms value of test voltage;
I_{kin} - maximum value of test current;
i_w - instantaneous value of current;
t_k - duration of short-circuit; duration of current passage;
cos φ - test circuit power factor;

5 Sequence and progress of the tests

The sequence of tests carried through is shown in table – see section 6. In the course of the test operations the PCL 818 data registration card was used for logging the electric current. The electricity meter was connected to the current terminals using Cu conductor of 16 mm² size (cross section).

6 Chart of measured values

Type	IVEP Reg. No.	ZO	NO	U_z (V)	I_{km} (kA)	t_k (ms)	Note
Daisy IVEL 3CFC 1T	175/16	T	164201	242	10.9	11.6	

7 Result of the test

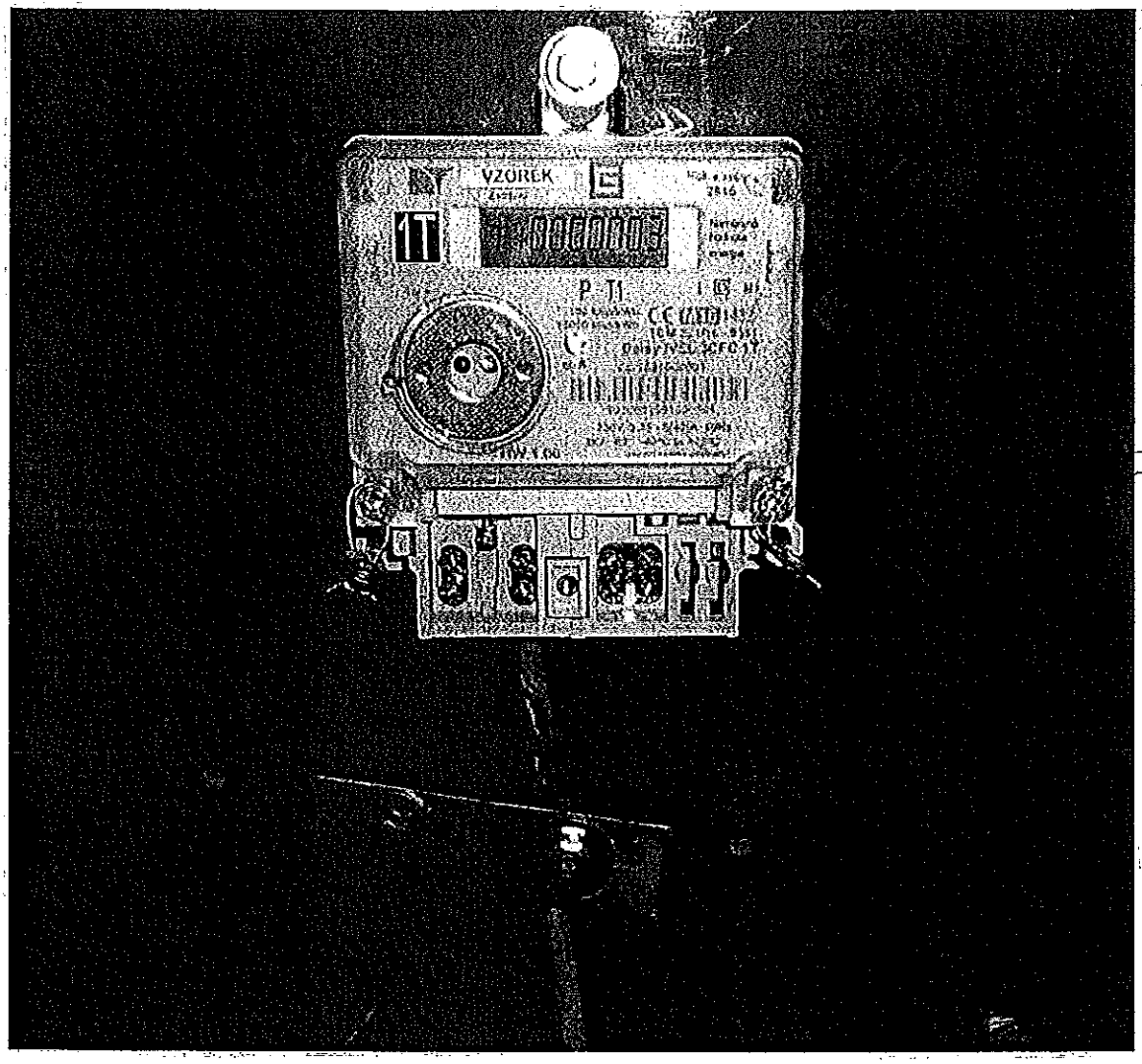
The tested single-phase electricity meter type Daisy IVEL 3CFC 1T, serial No. 1691000001, tested by short-time overcurrents according to the customer requirements 10 kA / 10 ms **passed**. During and after the test no visible changes of meter were observed.

8 Attendance at the tests

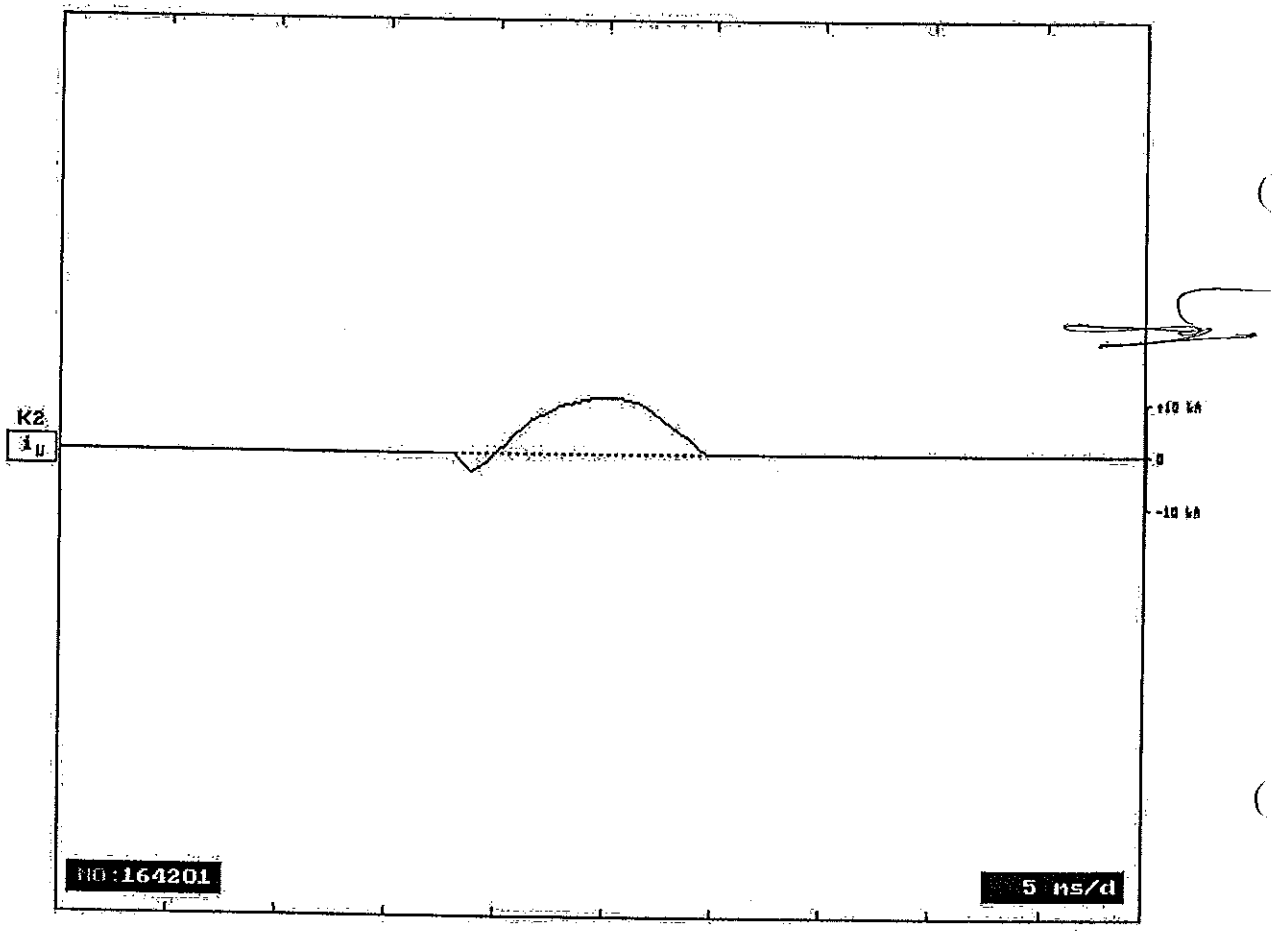
on behalf of:
IVEP, a.s.:

Petr Kalus
Zdeněk Svoboda

9. Photo of meter after the application of short-circuit



10 Oscilogram



Приложение № 4
техническото предложение

Д Е К Л А Р А Ц И Я

за приемане на условията в проекта на рамково споразумение и проекта на конкретен договор, неразделна част от рамковото споразумение

Долуподписаният **Славчо Христов Тороманов**, в качеството ми на представляващ **"Дейзи Технолоджи" ЕООД** участник в процедура за възлагане на обществена поръчка с реф. № PPD 17-115 и предмет: „Доставка на еднофазни и трифазни статични електромери за директно измерване", **обособена позиция №: 1** Доставка на еднофазни статични електромери за директно измерване на следните видове електромери:

1. Еднофазен статичен електромер за директно измерване, многотарифен, с LCD дисплей и вграден тарифен часовников превключвател – компактен.
2. Еднофазен статичен електромер за директно измерване, многотарифен, с LCD дисплей и вграден тарифен часовников превключвател - компактен, неразглобяем.

ДЕКЛАРИРАМ, ЧЕ:

1. Приемам условията в проекта на рамково споразумение, приложен в документацията за участие.

2. Приемам условията в проекта на конкретен договор, неразделна част от рамковото споразумение, приложен в документацията за участие.

Дата 10.10.2017 г.

ПОДПИС и ПЕЧАТ: _____

(Славчо Тороманов)
(Управител –Дейзи Технолоджи ЕООД)

Приложение № 5
техническото предложение

Д Е К Л А Р А Ц И Я
за срока на валидност на офертата

Долуподписаният **Славчо Христов Тороманов,**
(собствено, бащино, фамилно име)
притежаващ/а лична карта № **641645834**, издадена на **16.12.2010г.**, от **МВР-София обл.** ,
адрес: **Обл.Софийска, община Копривщица, гр.Копривщица, бул.Хаджи Ненчо Дончев 94**
(постоянен адрес)
в качеството ми на **Управител**
(посочва се длъжността)
на **"Дейзи Технолоджи" ЕООД,**
(посочете наименованието на участника)

участник в процедура за възлагане на обществена поръчка с реф. № PPD 17-115 и предмет: „Доставка на еднофазни и трифазни статични електромери за директно измерване", **обособена позиция №1:** Доставка на еднофазни статични електромери за директно измерване на следните видове електромери:

1. Еднофазен статичен електромер за директно измерване, многотарифен, с LCD дисплей и вграден тарифен часовников превключвател – компактен.
2. Еднофазен статичен електромер за директно измерване, многотарифен, с LCD дисплей и вграден тарифен часовников превключвател - компактен, неразглобяем.

(наименование на поръчката)

ДЕКЛАРИРАМ, ЧЕ:

С подаване на настоящата оферта, направените от нас предложения и поети ангажименти за **обособена позиция №: 1**, са валидни за срока, посочен в обявлението, считано от крайния срок за подаване на офертите.

Дата 10.10.2017 г.

ПОДПИС и ПЕЧАТ: _____
(Славчо Тороманов)
(Управител –Дейзи Технолоджи ЕООД)

Вх. №4-0183/29.09.2017

ЧЕЗ България ЕАД
CD-DOC-10539...
27 -09- 2017

РЕФЕРЕНЦИЯ

Във връзка с постъпило писмо с изх. № 4-4081 от „Дейзи технолоджи" ЕООД и вх. № CD-DOC-10444/25.09.2017 г., „ЧЕЗ България" ЕАД издава настоящата референция на фирма „Дейзи технолоджи" ЕООД в уверение на това, че същата е участвала в процедури, провеждани от „ЧЕЗ България" ЕАД и има сключен договор № PL-D13-007/18.02.2013 г. за доставка на:

- „Еднофазни и трифазни електромери за директно отчитане"

За периода от 01.10.2014 г. до 27.09.2017 г. са доставени:

- Ел-мер1Ф/2Тст.дир.час.DaisyIVEL3CFB,norm - 124 604 бр. на стойност 4 397 996,72 лв., без ДДС
- Ел-мер3Ф/2Тст.дир.час.DaisyADX11A,norm - 14 373 бр. на стойност 1 217 358,75 лв., без ДДС

През срока на действие на договор № PL-D13-007/18.02.2013 г., „Дейзи технолоджи" ЕООД изпълнява коректно задълженията си.

Доставяните изделия отговарят на заложените в договора изисквания и се придружават от необходимите сертификати, документи и инструкции за използване и монтаж.

Настоящата референция е в потвърждение на положителната оценка на „ЧЕЗ България" ЕАД за „Дейзи технолоджи" ЕООД и удовлетворението от съвместната работа.

ЧЕЗ България ЕАД 1.3 София

С уважение,

Даниел Убов
„ЧЕЗ България" ЕАД

Delivery certificate (reference document)

BUYER	Order number:	Delivery qty	Delivery date
CEZ Distribuční služby, s.r.o.		7 488	21.9.2014
CEZ Distribuční služby, s.r.o.		6 912	24.10.2014
CEZ Distribuční služby, s.r.o.		4 608	25.11.2014
CEZ Distribuční služby, s.r.o.	4101071735	7 488	19.12.2014
CEZ Distribuční služby, s.r.o.	4101071735	2 880	5.1.2015
CEZ Distribuční služby, s.r.o.	4101071735	7 680	27.1.2015
CEZ Distribuční služby, s.r.o.	4101071735	8 256	24.2.2015
CEZ Distribuční služby, s.r.o.	4101071735	8 448	26.3.2015
CEZ Distribuční služby, s.r.o.	4101071735	9 600	23.4.2015
CEZ Distribuční služby, s.r.o.	4101071735	8 832	25.5.2015
CEZ Distribuční služby, s.r.o.	4101071735	6 144	24.6.2015
CEZ Distribuční služby, s.r.o.	4101071735	5 952	27.7.2015
CEZ Distribuční služby, s.r.o.	4101071735	5 952	25.8.2015
CEZ Distribuční služby, s.r.o.	4101071735	7 104	23.9.2015
CEZ Distribuční služby, s.r.o.	4101071735	5 952	27.10.2015
CEZ Distribuční služby, s.r.o.	4101071735	2 712	24.11.2015
CEZ Distribuční služby, s.r.o.	4101071735	5 568	19.12.2015
CEZ Distribuční služby, s.r.o.	4101071735	5 184	27.1.2016
CEZ Distribuční služby, s.r.o.	4101071735	5 568	24.2.2016
CEZ Distribuční služby, s.r.o.	4101071735	6 336	26.3.2016
CEZ Distribuční služby, s.r.o.	4101071735	6 144	23.4.2016
CEZ Distribuční služby, s.r.o.	4101071735	6 144	25.5.2016
CEZ Distribuční služby, s.r.o.	4101071735	3 072	21.6.2016
CEZ Distribuční služby, s.r.o.	4101071735	4 224	26.7.2016
ČEZ Distribuce, a.s.	4101422892	1 920	25.8.2016
ČEZ Distribuce, a.s.	4101422892	4 800	23.9.2016
ČEZ Distribuce, a.s.	4101422892	3 456	27.10.2016
ČEZ Distribuce, a.s.	4101422892	3 456	24.11.2016
ČEZ Distribuce, a.s.	4101422892	5 952	22.12.2016
ČEZ Distribuce, a.s.	4101422892	5 952	27.1.2016
ČEZ Distribuce, a.s.	4101422892	6 144	24.2.2016
		179 928	

Contract number KSN 001-2017

DESCRIPTION	BUYER	Order number:	Delivery qty	Delivery date
Three phase static two tariff energy meter ADX12A-AD_U2H-V2C-G1-OK1 SAP number: 1003591890	ČEZ Distribuce, a.s.		2 688	22.8.2017
	ČEZ Distribuce, a.s.		7 392	28.8.2017
	ČEZ Distribuce, a.s.		10 080	22.9.2017
			20 160	

Invoices from 01.9.2014 to 10.10.2017

Invoice number	Date of invoice	Amount of invoice in EUR
6000001556	1.9.2014	€ 11 910,40
6000001558	3.10.2014	€ 195 609,60
6000001559	1.11.2014	€ 130 406,40
6000001561	8.12.2014	€ 211 910,40
6000001562	5.1.2015	€ 81 504,00
6000001563	5.2.2015	€ 217 344,00
6000001564	2.3.2015	€ 233 644,80
6000001566	1.4.2015	€ 239 078,40
6000001567	4.5.2015	€ 271 680,00
6000001568	1.6.2015	€ 263 635,20
6000001571	1.7.2015	€ 183 398,40
6000001572	3.8.2015	€ 177 667,20
6000001583	1.9.2015	€ 177 667,20
6000001589	1.10.2015	€ 212 054,40
6000001591	2.11.2015	€ 177 667,20
6000001595	1.12.2015	€ 80 953,20
6000001598	4.1.2016	€ 166 204,80
6000001600	1.2.2016	€ 154 742,40
6000001601	1.3.2016	€ 166 204,80
6000001603	1.4.2016	€ 189 129,60
6000001606	2.5.2016	€ 183 398,40
6000001607	1.6.2016	€ 183 398,40
6000001611	24.6.2016	€ 91 699,20
6000001613	1.8.2016	€ 126 086,40
6000001617	1.9.2016	€ 57 312,00
6000001622	4.10.2016	€ 143 280,00
6000001624	4.11.2016	€ 103 161,60
6000001625	4.12.2016	€ 103 161,60
6000001627	2.1.2017	€ 177 667,20
6000001630	1.2.2017	€ 177 667,20
6000001632	2.3.2017	€ 183 398,40

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Regular delivery certificate (reference document)

Contract number KSN 019-2011

DESCRIPTION	BUYER	Order number:	Delivery qty	Delivery date	Invoices from 01.10.2014 to 10.10.2017		
					Invoice number	Date of invoice	Amount of invoice in EUR
Three phase static two tariff energy meter ADX10-AD-U2H-V2X-G1-OK1 SAP number: 1003124300	CEZ Distribucni sluzby, s.r.o.		7 488	24.9.2014	6000001536	1.10.2014	€ 211 910,40
	CEZ Distribucni sluzby, s.r.o.		6 912	24.10.2014	6000001542	3.11.2014	€ 195 609,60
	CEZ Distribucni sluzby, s.r.o.		4 608	25.11.2014	6000001552	1.12.2014	€ 130 406,40
	CEZ Distribucni sluzby, s.r.o.	4101071735	7 488	19.12.2014	6000001561	8.1.2015	€ 211 910,40
	CEZ Distribucni sluzby, s.r.o.	4101071735	2 880	5.1.2015	6000001558	5.1.2015	€ 81 504,00
	CEZ Distribucni sluzby, s.r.o.	4101071735	7 680	27.1.2015	6000001563	5.2.2015	€ 217 344,00
	CEZ Distribucni sluzby, s.r.o.	4101071735	8 256	24.2.2015	6000001565	2.3.2015	€ 233 644,80
	CEZ Distribucni sluzby, s.r.o.	4101071735	8 448	26.3.2015	6000001568	1.4.2015	€ 239 078,40
	CEZ Distribucni sluzby, s.r.o.	4101071735	9 600	23.4.2015	6000001571	4.5.2015	€ 271 680,00
	CEZ Distribucni sluzby, s.r.o.	4101071735	8 832	25.5.2015	6000001575	1.6.2015	€ 263 635,20
	CEZ Distribucni sluzby, s.r.o.	4101071735	6 144	24.6.2015	6000001577	1.7.2015	€ 183 398,40
	CEZ Distribucni sluzby, s.r.o.	4101071735	5 952	27.7.2015	6000001582	3.8.2015	€ 177 667,20
	CEZ Distribucni sluzby, s.r.o.	4101071735	5 952	25.8.2015	6000001583	1.9.2015	€ 177 667,20
	CEZ Distribucni sluzby, s.r.o.	4101071735	7 104	23.9.2015	6000001589	1.10.2015	€ 212 054,40
	CEZ Distribucni sluzby, s.r.o.	4101071735	5 952	27.10.2015	6000001591	2.11.2015	€ 177 667,20
	CEZ Distribucni sluzby, s.r.o.	4101071735	2 712	24.11.2015	6000001595	1.12.2015	€ 80 953,20
	CEZ Distribucni sluzby, s.r.o.	4101071735	5 568	19.12.2015	6000001598	4.1.2016	€ 166 204,80
	CEZ Distribucni sluzby, s.r.o.	4101071735	5 184	27.1.2016	6000001600	1.2.2016	€ 154 742,40
	CEZ Distribucni sluzby, s.r.o.	4101071735	5 568	24.2.2016	6000001601	1.3.2016	€ 166 204,80
	CEZ Distribucni sluzby, s.r.o.	4101071735	6 336	26.3.2016	6000001603	1.4.2016	€ 189 129,60
	CEZ Distribucni sluzby, s.r.o.	4101071735	6 144	23.4.2016	6000001606	2.5.2016	€ 183 398,40
	CEZ Distribucni sluzby, s.r.o.	4101071735	6 144	25.5.2016	6000001607	1.6.2016	€ 183 398,40
	CEZ Distribucni sluzby, s.r.o.	4101071735	3 072	21.6.2016	6000001611	24.6.2016	€ 91 699,20
	ČEZ Distribuce, a.s.	4101422892	4 224	26.7.2016	6000001613	1.8.2016	€ 126 086,40
	ČEZ Distribuce, a.s.	4101422892	1 920	25.8.2016	6000001617	1.9.2016	€ 57 312,00
	ČEZ Distribuce, a.s.	4101422892	4 800	23.9.2016	6000001622	4.10.2016	€ 143 280,00
	ČEZ Distribuce, a.s.	4101422892	3 456	27.10.2016	6000001624	4.11.2016	€ 103 161,60
	ČEZ Distribuce, a.s.	4101422892	3 456	24.11.2016	6000001625	4.12.2016	€ 103 161,60
	ČEZ Distribuce, a.s.	4101422892	5 952	22.12.2016	6000001627	2.1.2017	€ 177 667,20
	ČEZ Distribuce, a.s.	4101422892	5 952	27.1.2016	6000001630	1.2.2017	€ 177 667,20
	ČEZ Distribuce, a.s.	4101422892	6 144	24.2.2016	6000001632	2.3.2017	€ 183 398,40
			179 928				

Contract number KSN 001-2017

DESCRIPTION	BUYER	Order number:	Delivery qty	Delivery date	Invoices from 01.10.2014 to 10.10.2017		
					Invoice number	Date of invoice	Amount of invoice in EUR
Three phase static two tariff energy meter ADX12A-AD_U2H-V2C-G1-OK1 SAP number: 1003591890	ČEZ Distribuce, a.s.		2 688	22.8.2017	6000001646	4.9.2017	2 093 952,00 Kč
	ČEZ Distribuce, a.s.		7 392	28.8.2017	6000001647	14.9.2017	5 758 368,00 Kč
	ČEZ Distribuce, a.s.		10 080	22.9.2017			
			20 160				

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